



FOR YOUR CONSIDERATION

THE REVENANT

BEST CINEMATOGRAPHY

EMMANUEL LUBEZKI, ASC/AMC



RICK CARTER
DARREN GILFORD
PRODUCTION DESIGN

ROGER GUYETT
VISUAL EFFECTS

JOEL ARON
STAR WARS REBELS

SPECIAL
COLLECTOR'S
ISSUE

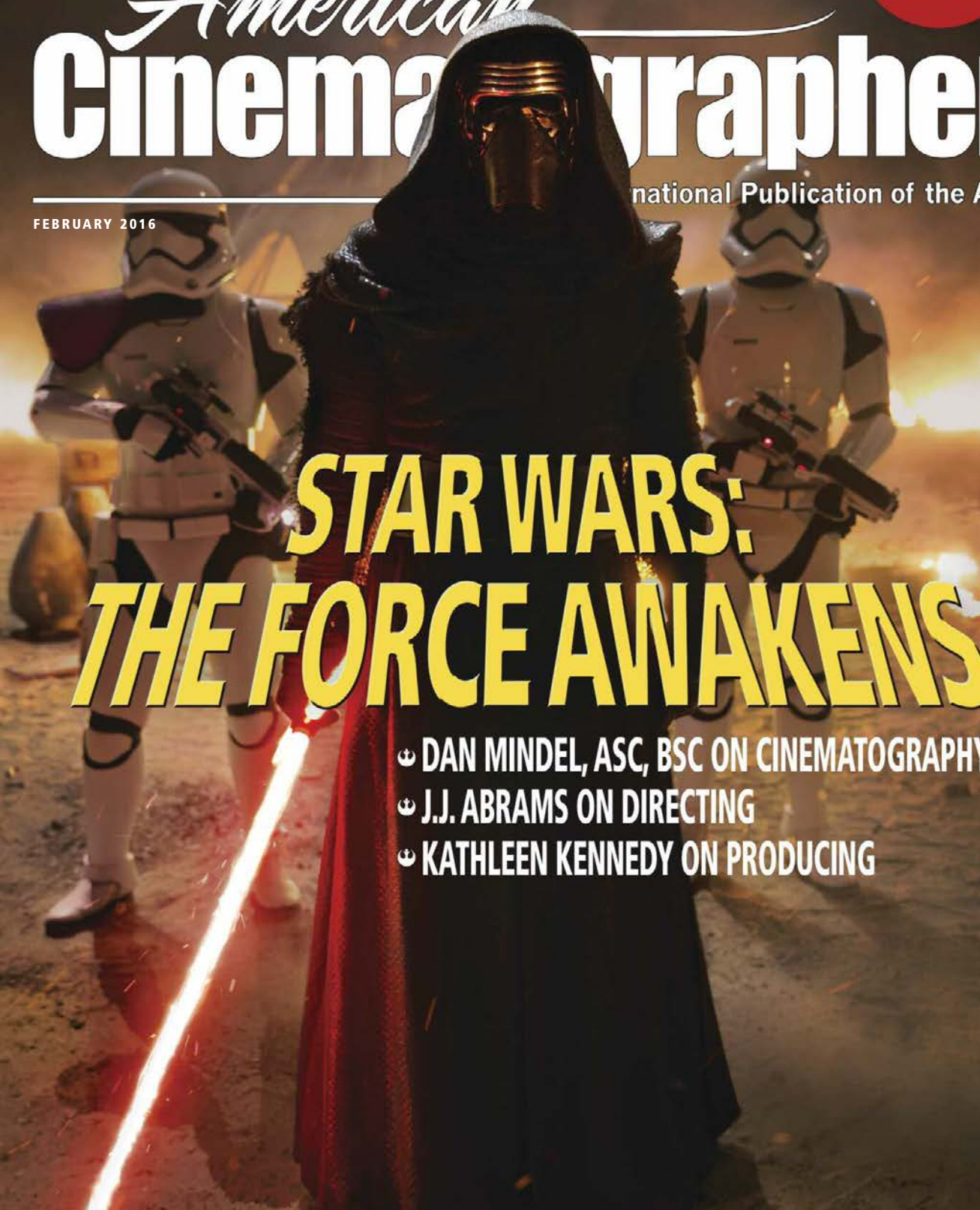
American Cinematographer

International Publication of the ASC

FEBRUARY 2016

STAR WARS: THE FORCE AWAKENS

- DAN MINDEL, ASC, BSC ON CINEMATOGRAPHY
- J.J. ABRAMS ON DIRECTING
- KATHLEEN KENNEDY ON PRODUCING



98FPS ISO800
1/48
00k 6k
2:1 DC2/RG4
12:19:56 RM B1
41%

φ



B C D

MENU

MODE

PWR
REC



THE FUTURE HAS ARRIVED. AGAIN.

- REVOLUTIONARY 6K RED DRAGON® SENSOR
- ABILITY TO UPGRADE TO 8K RED DRAGON® SENSOR
- SIMULTANEOUS R3D® RAW AND APPLE PRORES RECORDING
- INCREDIBLE DYNAMIC RANGE AND COLORIMETRY
- BLISTERING DATA TRANSFER RATES
- ONBOARD WIFI
- IN-CAMERA 1D AND 3D LUTS OUTPUT
- ...ALL UNDER 4 POUNDS



“It’s hard to believe I haven’t shot under 4K in five years. Format-wise S35 and FF35/VistaVision capture, is where I’ve found my creative voice. That’s why Schneider Kreuznach Xenon FF-Primes are my workhorse lenses. They provide me flexibility for both narrative and commercial filming and have a natural, pleasing lens character while still being cost-effective.

Their feature set covers the fundamentals with consistent color matched optics and precisely measured T-stops—a must for lenses you use day in and day out. Pulling focus is smooth with minimal breathing. Each lens offers a similar size, weight, gear placement and I even make use of the 95mm thread for front filters when rigging lightweight. Their robust lens body design is nice and compact while remaining relatively slender. That really helps when building a rig.

At the end it comes down to the look of a lens for me. I’ve found the Xenon FF-Primes to have a pseudo-modern and classical look. They have a smooth draw while still extracting the detail you want. They’ve become my standard speeds for these modern times. With larger sensors coming over the horizon and my preference of format sizes, they are so very forward thinking. I’ll be shooting with them for years to come. ”



HOLLAND GETS MORE K WITH FF-PRIMES

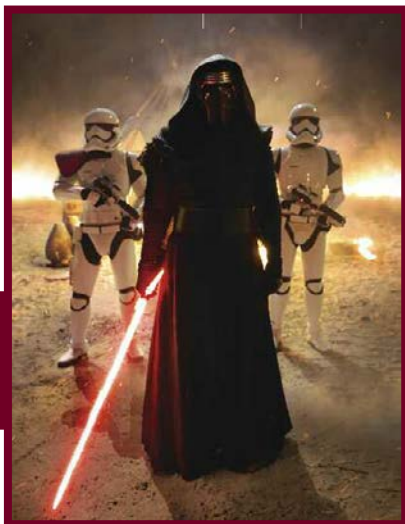
Phil Holland is known for his work as a Digital Colorist, Digital Imaging Specialist, and DP/Director. As a DIS, he worked on dozens of films including: *Life of Pi*, *X-Men: First Class*, *Cabin in the*

Woods, *Angels and Demons* and *Yogi Bear*. He has just completed an international cross platform project for the world’s top technology/media company.

www.schneideroptics.com

Phone: 818-766-3715 • 800-228-1254 • email: info@schneideroptics.com





American Cinematographer

An International Publication of the ASC

On Our Cover: Dark Side disciple Kylo Ren (Adam Driver) leads First Order stormtroopers in a raid on the desert planet Jakku in *Star Wars: The Force Awakens*, shot by Dan Mindel, ASC, BSC. (Photo by David James, courtesy of Lucasfilm Ltd.)

FEATURES

- 36 **A Visit to the Set**
The Force Awakens' production crew welcomes *AC* to Pinewood Studios
- 50 **A Space Opera's High Notes**
 Cinematographer Dan Mindel, ASC, BSC honors the *Star Wars* look as he helps propel the franchise forward
- 66 **Force Perspective**
 Co-production designers Rick Carter and Darren Gilford work with a team of concept artists to visualize the galaxy
- 78 **Blurring the Line**
 Visual-effects supervisor Roger Guyett helps bridge the gap between practical and digital space



50



66



78

DEPARTMENTS

- 10 Editor's Note
- 12 President's Desk
- 14 Short Takes: *Black Angel*
- 20 Production Slate: *Star Wars Rebels*
- 86 New Products & Services
- 90 International Marketplace
- 91 Classified Ads
- 92 Ad Index
- 94 Clubhouse News
- 96 ASC Close-Up: Greig Fraser

American Cinematographer

An International Publication of the ASC

Visit us online to read interviews with these ASC Award nominees:

Television Series



Marco Polo, "The Fourth Step"



12 Monkeys, "Mentally Divergent"



Gotham, "Strike Force"



Game of Thrones, "Hardhome"

Vanja Černjul, ASC, HFS

Marco Polo, "The Fourth Step"

David Greene, CSC

12 Monkeys, "Mentally Divergent"

Christopher Norr

Gotham, "Strike Force"

Crescenzo Notarile, ASC, AIC

Gotham, "Scarification"

Fabian Wagner, BSC

Game of Thrones, "Hardhome"



Gotham, "Scarification"

Television MOW/Miniseries/Pilot



Casanova



The Man in the High Castle



Blindspot

Martin Ahlgren

Blindspot (Pilot)

Pierre Gill, CSC

Casanova (Pilot)

James Hawkinson

The Man in the High Castle (Pilot)

Jeffrey Jur, ASC

Bessie

Romain Lacourbas

Marco Polo (Pilot)



Bessie

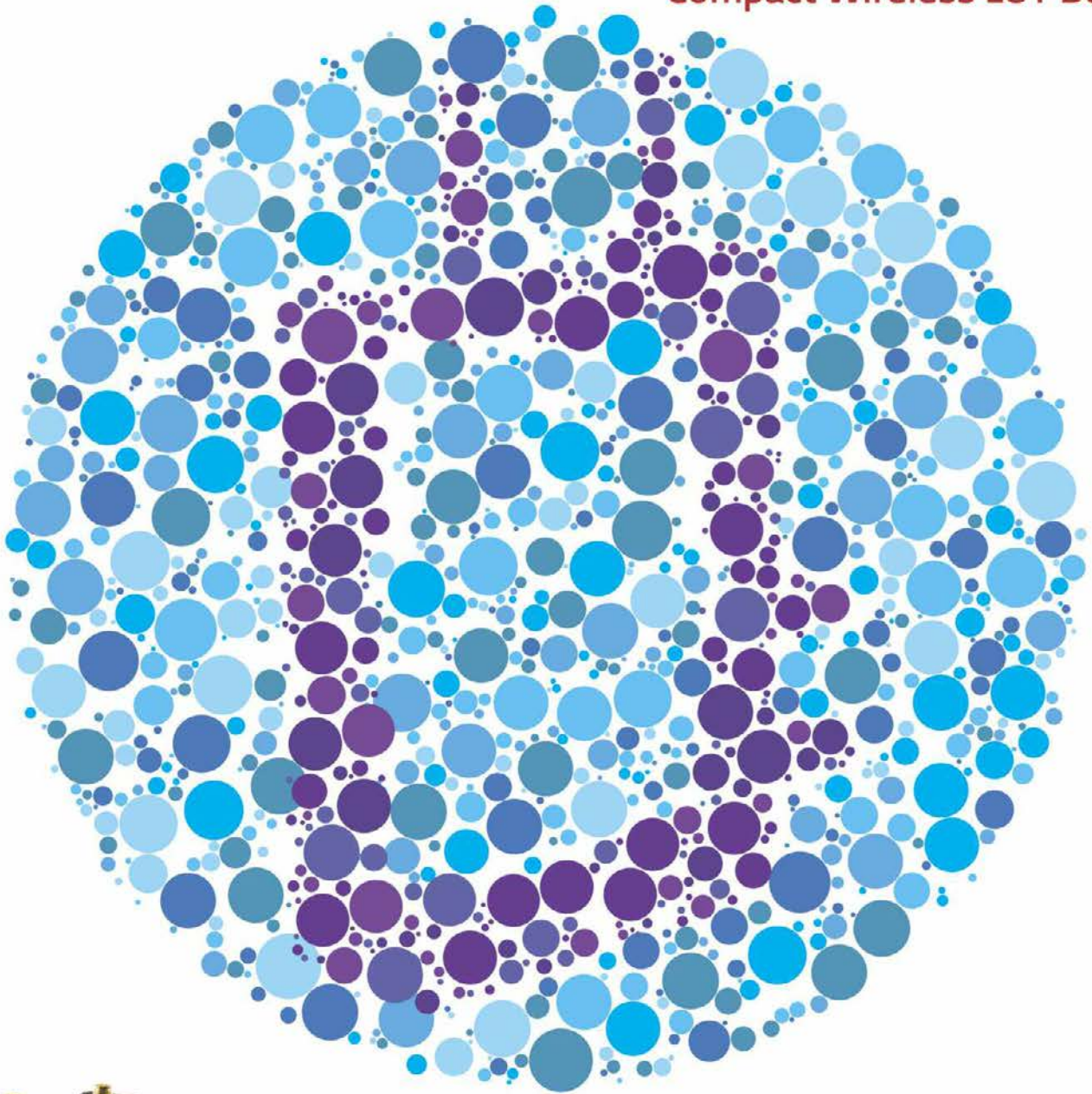


Marco Polo

Winners will be announced Feb. 14 at the 30th ASC Awards!

COLOR Blind?

Compact Wireless LUT Box



- 33pt 3D LUTs
- Dual HD-SDI & HDMI I/O
- Up/Down/Cross Conversion
- Pomfort LiveGrade Pro Integration
- RED & ARRI Camera Control

COLOR

colr.teradek.com


The Future of Wireless Video

American Cinematographer

Visit us online at **www.theasc.com**

EDITOR-IN-CHIEF and PUBLISHER

Stephen Pizzello

EDITORIAL

MANAGING EDITOR Jon D. Witmer

ASSOCIATE EDITOR Andrew Fish

TECHNICAL EDITOR Christopher Probst

CONTRIBUTING WRITERS

Benjamin B, Douglas Bankston, John Calhoun, Mark Dillon, Michael Goldman, Simon Gray,
Jay Holben, Noah Kadner, Debra Kaufman, Iain Marcks, Jean Oppenheimer, Phil Rhodes, Patricia Thomson

ART & DESIGN

CREATIVE DIRECTOR Marion Kramer

PHOTO EDITOR Kelly Brinker

ONLINE

MANAGING DIRECTOR Rachael K. Bosley

PODCASTS Jim Hemphill, Iain Stasukevich, Chase Yeremian

BLOGS

Benjamin B

John Bailey, ASC

David Heuring

WEB DEVELOPER Jon Stout

ADVERTISING

ADVERTISING SALES DIRECTOR Angie Gollmann

323-936-3769 Fax 323-936-9188 e-mail: angiegollmann@gmail.com

ADVERTISING SALES DIRECTOR Sanja Pearce

323-952-2114 Fax 323-952-2140 e-mail: sanja@ascmag.com

CLASSIFIEDS/ADVERTISING COORDINATOR Diella Peru

323-952-2124 Fax 323-952-2140 e-mail: diella@ascmag.com

SUBSCRIPTIONS, BOOKS & PRODUCTS

CIRCULATION DIRECTOR Saul Molina

CIRCULATION MANAGER Alex Lopez

SHIPPING MANAGER Miguel Madrigal

ASC GENERAL MANAGER Brett Grauman

ASC EVENTS COORDINATOR Patricia Armacost

ASC PRESIDENT'S ASSISTANT Delphine Figueras

ASC ACCOUNTING MANAGER Mila Basely

ASC ACCOUNTS RECEIVABLE Nelson Sandoval

American Cinematographer (ISSN 0002-7928), established 1920 and in its 96th year of publication, is published monthly in Hollywood by
ASC Holding Corp., 1782 N. Orange Dr., Hollywood, CA 90028, U.S.A.,

(800) 448-0145, (323) 969-4333, Fax (323) 876-4973, direct line for subscription inquiries (323) 969-4344.

Subscriptions: U.S. \$50; Canada/Mexico \$70; all other foreign countries \$95 a year (remit international Money Order or other exchange payable in U.S. \$).
Advertising: Rate card upon request from Hollywood office. Copyright 2016 ASC Holding Corp. (All rights reserved.) Periodicals postage paid at Los Angeles, CA
and at additional mailing offices. Printed in the USA.

POSTMASTER: Send address change to *American Cinematographer*, P.O. Box 2230, Hollywood, CA 90078.



Panasonic

It's all in here to make a living or a movie.

The world's first 4/3" large format, 4K handheld camcorder.

Introducing the AG-DVX200PJ. It takes creativity to a new level. Ready to go with its integrated 13X Leica DICOMAR 4K lens that provides shallow depth-of-field/selective focus. This rugged new camcorder captures 4096 X 2160 4K at 24p, 3840 X 2160 UHD and 1080p at 23.98p, 29.97p and 59.94p. Its 12 stops of latitude from a V-Log Lite gamma curve and future-proof dual codec mode for simultaneous UHD and HD recording ensures that you are equipped with everything you need for success. Learn more at us.panasonic.com/dvx200



4K The New AG-DVX200PJ

ASC MASTER CLASS

LEARN FROM THE BEST



Photo by Alex Lopez

ASC Master Class with Guillermo Navarro, ASC

REGISTER NOW FOR 2016

March 7-11
May 9-13
June 20-24

Visit our website for updates

www.theasc.com



American Society of Cinematographers

The ASC is not a labor union or a guild, but an educational, cultural and professional organization. Membership is by invitation to those who are actively engaged as directors of photography and have demonstrated outstanding ability. ASC membership has become one of the highest honors that can be bestowed upon a professional cinematographer — a mark of prestige and excellence.

OFFICERS - 2015/2016

Richard Crudo
President

Owen Roizman
Vice President

Kees van Oostrum
Vice President

Lowell Peterson
Vice President

Matthew Leonetti
Treasurer

Frederic Goodich
Secretary

Isidore Mankofsky
Sergeant-at-Arms

MEMBERS OF THE BOARD

John Bailey
Bill Bennett
Richard Crudo
George Spiro Dible
Richard Edlund
Fred Elmes
Michael Goi
Victor J. Kemper
Daryn Okada
Lowell Peterson
Robert Primes
Owen Roizman
Rodney Taylor
Kees van Oostrum
Haskell Wexler

ALTERNATES

Isidore Mankofsky
Karl Walter Lindenlaub
Kenneth Zunder
Francis Kenny
John C. Flinn III

MUSEUM CURATOR
Steve Gainer



Shape the sky.

SkyPanel accessories: what's your configuration?

SkyPanel is a versatile family of compact and fully tuneable LED soft lights, delivering light of unsurpassed power and quality. A wide range of accessories greatly expands the functionality of the SkyPanel luminaires by enhancing their light controllability, mounting options, portability and application possibilities.



Mounting options



Light control options



Battery options

Explore the new SkyPanel accessories:
www.arri.com/skypanel

SKYPANEL
SOFT LIGHTING | REDEFINED

ARRI

THIS MONTH'S CONTRIBUTORS

Andrew Fish

is the associate editor
("At the Helm," p. 42;
"A Presidential Briefing,"
p. 70).

Jay Holben

is a filmmaker and a
Los Angeles correspondent
for the magazine ("A
Unique Second Unit,"
p. 60).

Noah Kadner

is a workflow specialist
whose clients include
Panasonic and Apple, Inc.
("A Visit to the Set," p. 36;
"Blurring the Line," p. 78;
"Exploring All
Possibilities," p. 82).

Iain Marcks

is a filmmaker and a
New York correspondent
for the magazine ("A
Space Opera's High
Notes," p. 50).

Jon D. Witmer

is the managing editor
(Short Takes, p. 14;
Production Slate, p. 20;
"Force Perspective," p. 66).

Editor's Note



The moment we began planning this special issue on *Star Wars: The Force Awakens*, I knew our readers were in good hands.

While rounding up the editorial staff for an early brainstorming session, my first stop was managing editor Jon Witmer's office, where visitors are greeted by a desktop display of six (6) miniature *Millennium Falcon* models in various sizes. Witmer was already clearing space for a special *Force Awakens* shelf, where the exhibit now includes die-cast versions of Kylo Ren's shuttle, two TIE fighters, a pair of X-wings (one with a white hull and one clad in black), and a First Order snowspeeder.

My next stop was associate editor Andrew Fish's workspace, where folks can ponder a Darth Vader helmet with built-in voice changer; a sand person straddling a Bantha; and a semicircle of figurines depicting musician Max Rebo and his band, last seen entertaining the villainous scum aboard Jabba the Hutt's sail barge.

I then poked my head into photo editor Kelly Brinker's office, where Yoda proffers a bowl of candy. Beyond the Jedi Master, a lightsaber is mounted prominently on the wall.

Some time later, I stumbled upon the three of them divvying up *Star Wars* Lego figurines from a winter advent calendar. Fish recalls me gazing down upon their mini-convention and remarking, "I feel very secure that the right people are putting this issue together."

Apparently, director J.J. Abrams shares this sentiment, because he and our allies at Lucasfilm approved AC for a very confidential set visit during production of *The Force Awakens* at Pinewood Studios near London. I made the pilgrimage with contributing writer Noah Kadner, another fervent *Star Wars* fanatic who appeared to be levitating a foot off the ground the entire time. By the end of our visit, when we were granted the rare privilege of piloting the *Millennium Falcon* (see photo on page 49 for irrefutable proof), Noah's eyes were bugging out of his head like Admiral Ackbar's.

A full team effort was made to bring you this collector's edition. Kadner wrote a first-person account of our production tour (page 36) while also contributing Q&As with visual-effects supervisor Roger Guyett (page 78) and ILM visual-effects supervisor Pat Tubach (page 82); Iain Marcks penned our article on the first-unit cinematography of Dan Mindel, ASC, BSC (page 50); Jay Holben wrote our piece on the show's additional cinematography (page 60); Witmer provided detailed coverage of the production design (page 66), as well as an article on the animated spinoff series *Star Wars Rebels* (page 20) and a Short Takes historical on *Black Angel*, a 1980 project directed by *Star Wars* alumnus Roger Christian and shot by Roger Pratt, BSC (page 14). Meanwhile, Fish interviewed Abrams (page 42) and producer/Lucasfilm president Kathleen Kennedy (page 70). Creative director Micki Kramer (whose office is a collectible-free zone) tackled the cover and overall design.

If I needed further proof of the staff's *Star Wars* bona fides, I got it after attending a press screening of *The Force Awakens* on the Disney lot with Witmer, Fish and my 9-year-old son, Nicholas. We all took a spin through the Disney Store, where I spotted a super-cool Resistance fighter-pilot jacket for Nicholas. As he tried it on for the first time, my fellow editors broke out in beads of excited perspiration and asked, "Do they have that jacket in adult sizes?"

I hope you enjoy reading this issue as much as our staff and writers enjoyed producing it.

Stephen Pizzello
Editor-in-Chief and Publisher



DAVINCI RESOLVE 12

The world's best color corrector is now the world's best editor!

Only DaVinci Resolve 12 combines professional editing with advanced color correction so you can edit and grade from start to finish, all in one single software tool! With over 80 incredible new features including multicam editing, advanced trimming, high performance audio, and incredible media management, DaVinci Resolve 12 is the editing solution you've been waiting for.

Super Fast Editing

DaVinci Resolve 12 has a massive set of professional editing and trimming tools that work exactly as you expect. You get context sensitive editing, dynamic and asymmetric trimming, titling, transitions, animation and more! The familiar multi track timeline, customizable interface and keyboard shortcuts make it easy to switch to DaVinci Resolve 12.

Incredible Multicam

No matter how many cameras you have on your shoot, DaVinci Resolve 12 lets you edit programs shot on multiple cameras faster than ever before. Quickly sync angles using timecode, in/out points, or even automatically based on sound and then watch them all playback in realtime while you cut between angles on the fly!

Unlimited Audio Effects

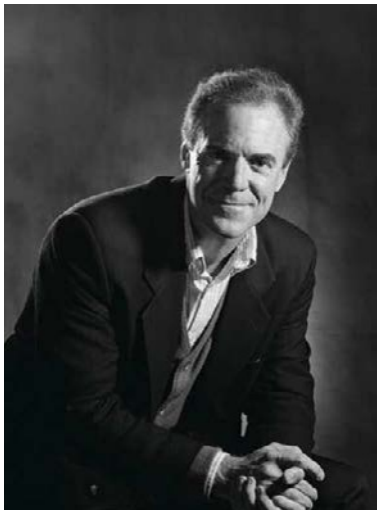
Now you can create the perfect mix by adding VST and Audio Unit plugins to entire tracks or individual clips! Resolve's sample accurate playback and smooth tape style scrubbing let you precisely edit audio in the timeline, or you can record fader automation using the new mixer! You can even export directly to ProTools for finishing!

Hollywood's Best Color

DaVinci is the world's most trusted name in color and has been used to grade more Hollywood films, TV shows, and commercials than anything else. Now you can switch between professional editing and Resolve's legendary color tools with a single click. DaVinci Resolve 12 goes far beyond anything you'll find in any other editing systems!



President's Desk



Wise people often claim that the small pleasures are the ones that truly make life worth living. I'm inclined to agree, especially when I consider the enjoyment I get out of tuning in to the Turner Classic Movie channel. The other night I was drowsing out before bed and stumbled upon a lousy picture that nevertheless shook me out of my torpor and got me thinking on a level that was way too sophisticated for such trash. *It! The Terror From Beyond Space* (1958) is certainly no *Citizen Kane* — it's not even *Abbott and Costello Meet Frankenstein*. But it is as informative in its own way as any movie I can think of.

Why? Because of the *context* within which the movie was created and its *relativity* to the world we live in now.

I'm not a big science-fiction fan and this one did nothing to change my orientation. ASC member Ken Peach was the cinematographer, and it's no knock on him to say this was hardly his best work. The story is a simpleton's dream, too: A group of astronauts on the first launch to Mars are stalked and murdered in their spaceship by a mysterious, shape-shifting force. Don't be surprised if the premise sounds familiar; it served as the source material for a tremendously improved treatment of the same dilemma — *Alien* — but that's where the resemblance ends. Bad writing, clumsy direction, cardboard sets and terrible acting all conspire to send you screaming from the room. The special effects are laughable and the monster, when it finally appears,

looks like the Creature From the Black Lagoon's destitute cousin. Insult to injury, the hysterical proceedings are underscored by a relentless Theremin-driven music track. I assure you, this was not what inspired Jimmy Page to use that instrument in the Led Zeppelin stage shows some 15 years later.

Obviously, the world has changed in a million ways since 1958. On a certain level, this movie was about the technology of its day, its fantasies and aspirations. That the makers' treatment of it has become unintentionally comical is not entirely their fault and begs a troubling question: Six decades from now, will people have a similar reaction to aspects of the work we produce today? In the worst-case scenario, will the fruit of our careers appear as *pathetic* to them as so much of this film does to us now? Or is the best we can hope for to simply seem *antiquated*?

Just think about how we mark so much of our work lives. Hop onto a feature or TV series and you see six months of your life go by in a flash. In terms of style and culture, what used to become old-hat in a year now burns out in a couple of weeks. With time passing so quickly and our society changing so rapidly, we may well find ourselves and what we've done appearing as discarded anachronisms sooner than we imagine. *Appreciably* sooner.

But then again, maybe not.

As contemporary people always have, we think of ourselves as the epitome of sophistication. We're arrogant, we imagine no one has ever done or thought about anything the way we do right at this moment, and we think we've got it more right than anyone ever has. What idiots we are! The fact is that there is no idea, emotion, impulse or action left on Earth that hasn't been conceived of or experienced by someone — more likely *many* someones — long before any of us were on the scene.

And that's okay. After all, we can only make films with the awareness and sensitivity we embody at this moment, hoping for the best in the process. Beyond that, we have no control. Fortunately, this allows a freedom that helps us to create wildly and without regard for the consequence. It's also not the worst thing in the world to have someone get a good laugh out of your work some six decades down the line. At least you'd be remembered for offering a witness to the time and world in which you once lived.

So how will we ever know our fate? My best wish is that we're all around in 2074 to find out.

A handwritten signature in black ink that reads "Richard P. Crudo, ASC". The signature is stylized and fluid.

Richard P. Crudo
ASC President



Your New Go-to Lens For the 21st Century

A True, Front Anamorphic Zoom



NEW Cooke 35-140mm Anamorphic/i[®] Zoom

Like the Cooke 20–100mm for 35mm, the standard lens during the last century, our **new Cooke 35–140mm Anamorphic/i zoom** will be your go-to lens for the new era of anamorphic filmmaking.

Cooke's new patented optical design brings together a unique combination of attributes in one lens:

Shoot from very wide angle to telephoto with a 4x zoom ratio. And, like our Cooke Anamorphic/i prime lenses, the new 35–140mm zoom is a true, front anamorphic with 2x squeeze, offering oval bokeh and the other coveted characteristics you want when shooting anamorphic.

There's more: Oval bokeh throughout zoom and focus, colour and depth of field characteristics matched to the Anamorphic/i primes, /i Technology, and The Cooke Look[®], of course.

A 4x true, front anamorphic zoom with the creative flexibility that cinematographers have waited years to have. The new Cooke 35–140mm Anamorphic/i zoom. Your new go-to lens for the new era.

CookeOpticsLimited

British Optical Innovation and Quality Since 1893.

cookeoptics.com

T: +44 (0)116 264 0700

Canada, South America, USA:

T: +1-973-335-4460

Short Takes



Shot on location in Scotland during the late autumn of 1979, the short film *Black Angel* was made with 25,000 pounds in grant money, two horses, four actors, a seven-day shooting schedule and a crew of nine.

Black Angel Strikes Back

By Jon D. Witmer

When *The Empire Strikes Back* was first released theatrically in 1980, it was preceded in some 400 U.K. cinemas by a short film about a knight whose life is saved by a young maiden, whom he then pledges to free from death incarnate. That film, *Black Angel*, was written, directed and produced by Roger Christian, whose already storied career at the start of the '80s had seen him work as art director on *Alien* and *Monty Python's Life of Brian* after he'd received an Oscar for his contributions as set decorator on the first *Star Wars*.

Despite the film's limited geographical distribution, its influence was significant, as were the careers it helped launch. Christian, for one, would go on to serve as second-unit director on *Return of the Jedi* and *The Phantom Menace*, as well as to direct such features as *Nostradamus*, *Masterminds* and *Battlefield Earth*.

Additionally, cinematographer Roger Pratt was notching one of his first credits in a career that would take him into the ranks of the BSC and place him behind the camera of such features as *Batman*, *Twelve Monkeys* (AC Jan. '96) and two *Harry Potter* films — *Chamber of Secrets* and *Goblet of Fire*. "He became a legend," Christian says. "I worked with him again on the [Academy Award winning] short film *The Dollar Bottom*, then for my first feature [*The Sender*], and then Terry Gilliam took him for *Brazil*." (Due to health reasons, Pratt was unable to participate in this story.)

Christian developed *Black Angel's* script while studying direct-

ing at the National Film and Television School in Buckinghamshire, England, where he enrolled after wrapping on *Alien*. "I conceived a story about the last moment of a knight's life, when this dream comes about," says Christian, speaking with AC over the phone from his home in Toronto. "I took the idea from a book I love called *Pincher Martin* by William Golding." In Christian's story, the knight, Sir Maddox (Tony Vogel), returns from war to find his home in ruins and his family dead. While pursuing those responsible, he falls into a lake and is on the verge of drowning when the maiden (Patricia Christian) pleads on his behalf, "Stay your hand, Lord Death. Take me instead." Owing his life to this maiden, Maddox determines to confront her master, the Black Angel.

Christian was sitting in on director Ridley Scott's sound-mixing sessions for *Alien* when Sanford "Sandy" Lieberman — who at the time was head of 20th Century Fox's U.K. arm — paid a visit. Christian mentioned his script, and Lieberman asked to read it. "He called me the next morning and said, 'Do you mind if I send this to George Lucas?'" Christian recounts. Lucas, who had not been pleased with Fox's choice for the short film that accompanied *Star Wars*, was in the process of personally selecting the short that would be paired with *The Empire Strikes Back* in U.K. cinemas.

In short order, Christian was given the green light, along with a grant. He reflects, "I suddenly found myself with 25,000 pounds and this ambitious [project], and I was thinking, 'Who can I get to shoot this?'" He had met Pratt through Gilliam, and as Christian explains it, "Terry said, 'Why don't you try him out? You've got no money and I think he's got talent.' ➤

Photos and frame grab courtesy of Roger Christian.

DO YOU THINK FASTER?
THINK IN BOLT
THINK IN MEXICO



TWO HIGH SPEED ROBOTS
TWO FULL SETS OF MODEL MOVERS
FULL EQUIPMENT & SOUND STAGE SERVICES

REVOLUTION
MÉXICO

(5255) 5605 8060
revo1999@prodigy.net.mx

(5255) 6840 2676
info@boltstagemexico.com

(52155) 5412 4365
viramfx@gmail.com

www.boltstagemexico.com



Above: Director Roger Christian (right) points Sir Maddox (Tony Vogel) toward his destiny. Right: Cinematographer and future BSC member Roger Pratt tries to provide cover from the incessant rain as Christian checks the framing of the Panavision Arri 35 II-C camera.



"I think if I'd have gone off with an experienced cinematographer, they'd have just said, 'You can't shoot this,'" the director continues. "Roger had the instinct and bravery that made this work."

As the collaborators plunged into preproduction, a handful of visual references came to the fore. "I love Tarkovsky," Christian notes. "I looked at a lot of Bergman films. I also hero-worshipped Kurosawa." The latter, he observes, "always set his films in these incredible landscapes. I knew Scotland would give me that, and we could get there on the train." Another inspiration, he adds, "was [Frank] Frazetta's painting *Death Dealer*. That was a model for my *Black Angel* — if I could create one with no money!"

The Kurosawa influence also prompted Christian and Pratt to shoot anamorphic 35mm, and so they rented a Panavision C Series lens package and a Panavision Arriflex 35 II-C camera from

Samuelson's in London. For film stock, Lucas and producer Gary Kurtz donated the short ends left over from *The Empire Strikes Back* — predominantly Eastman Kodak 100T 5247 — on top of which Christian could afford to buy only three complete rolls of film.

Pratt's lighting package for the seven-day shoot comprised a single Redhead, which he supplemented with bounce boards while taking advantage of the late-autumn light. "I knew right before winter hits, the skies in Scotland are just stunning, with these veins of light coming through clouds," Christian recalls.

"It rained the whole time," he continues. "But the rain in Scotland is like a mist, which added to the beauty of these shots." To supplement the natural mist, he adds, "John Beard, the art director, would use a handheld smoke machine." Pratt carried neutral-density filters, as well as a polarizer to heighten the cloud formations,

but most of the film was shot clean and, out of necessity, wide open.

Early in the shoot, Christian says, "I saw Roger puzzling over his light meter, and I said, 'Roger, do you have a problem?' He said, 'Look at the meter. It's telling me there isn't enough light to shoot. Now look through the camera.' We looked through the camera, and he said, 'It's stunning.' So he literally threw the meter over his shoulder, into the dirt, and said, 'That's it! We're going by instinct from now on!'"

Transporting its equipment in a Volkswagen Bus driven by grip Tony Andrews, the production shot in locations from Eilean Donan Castle, which served as Maddox's home, to the town of Dunoon, where Christian secured an indoor swimming pool in which to film the shots of the drowning knight. "We hung a piece of black velvet in the pool so the background would be black," Christian explains. After securing the camera in an underwater housing, he adds, "Roger went in the pool with the focus puller, Brian Herlihy."

In post, Christian worked with editor Alan Strachan at Samuelson's Production Village. It was Strachan who suggested step-printing Maddox's fight with the Black Angel to create a stuttering slow-motion effect. "I would like to have done the fights really down and dirty, but without a stunt coordinator I couldn't," Christian says. "To make it work, it had to be fairly stylized."

"I also had a contract that said [the film needed to be] 25 minutes, and when we cut the film together, we were short," he continues. "So we step-printed the fights, and that brought the time up to 25 minutes exactly!"

Black Angel's negative was processed at Rank Laboratories in Denham, England, where the final color timing was also performed. Once completed, the film had to be shown to Lucas, who was joined by a small but formidable audience that included his *Empire Strikes Back* cohorts Kurtz, associate producer Robert Watts and director Irvin Kershner. "That first screening got me under the table," Christian recalls with a laugh. "I'd made this film with no money and short ends, and suddenly there it was on the biggest screen in Pinewood [Studios]. It was incredibly frightening. But George liked it — they all did — and he



THE NEW STANDARD

ARTIST SERIES



SUPERIOR QUALITY OF LIGHT

ON-SET/STAGE LOCATION BROADCAST

BI-COLOR TUNGSTEN & DAYLIGHT

INCREASED OUTPUT · EXPANDED KELVIN RANGE · FULLY DIMMABLE

LEARN MORE ABOUT THE ARTIST SERIES 300BC AT
MACTECHLED.COM · 818.777.1281

Dealership Opportunities Available

Pratt (right) confers with his collaborators before filming Maddox's drowning, which marked the final shot of the production. As the crew drove away, Christian says, "It was thick with snow, pouring down out of the sky. If that had come during the shoot, I'd have been screwed completely! The crew all said to me, 'You are one jammy bastard. We don't know how you did this!'"



said, "That's going out with *Empire*."

Lucas and Kershner even adopted the film's step-printing technique in *The Empire Strikes Back*, for the scene in which Luke Skywalker confronts a vision of Darth Vader on the swamp planet Dagobah. Director John Boorman was also impressed, and he screened the film for his crew in advance of principal photography on *Excalibur*. Nevertheless, *Black Angel* seemed destined to become just the stuff of cinema legend after Christian's personal print, as well as a print that had been archived at Lucasfilm, went missing.

But then, in 2012, Christian received a phone call from Bob O'Neill, who at the time was an archivist at NBCUniversal and had found *Black Angel's* negative and inter-positive while clearing the shelves. Shortly after O'Neill's phone call, *Wired* ran a story about the discovery, and, Christian says, "about two months later, another phone call out of the blue comes in." This time, it was from postproduction and visual-effects veterans Brice Parker and David Tanaka, who had read the article and wanted to pool their resources to restore the film.

Parker, currently a producer at Weta Digital in New Zealand, was then working as a technical manager at Pixar Animation Studios in Emeryville, Calif., where Tanaka was employed as a creative editor; the two were also fellow board members of the Visual Effects Society's Bay Area Section. In an email interview, Parker relates that he and Tanaka had "both previously worked for Industrial Light & Magic, [so] we had a deep interest in and familiarity with the history of the *Star Wars* cinematic universe."

In fact, Tanaka had worked as a visual-effects editor on the *Star Wars Special*

Editions (AC Feb. '97). In a phone interview from the San Francisco Bay Area — where he had just wrapped his work as creative editor for the touring musical event *Star Trek: The Ultimate Voyage* — he emphasizes, "One of our commitments to this project was to stay true to what Roger did 30 years ago."

As a first step in the restoration, Parker flew to Los Angeles, where EFilm scanned the film elements full aperture at 6K on a pin-registered Arriscan, down-rezzing to 4K (4096x3112) and recording 10-bit DPX files in log color space. Josh Haynie, EFilm's scanning supervisor and vice president of operations, also oversaw the creation of 2K (2048x1556) elements down-rezzed from the 4K files, as well as the creation of HD QuickTime files. The 2K files became the working element for further color and cleanup work, while the 4K scan was archived to LTO 5 as an additional backup for future use.

Next, Deluxe and Chace Audio performed a telecine from the sound negative to digitize the audio. It was then back to the Bay Area, where Parker and Tanaka enlisted the help of Jon Peters, the CEO of Athena Studios. For nearly all of this work, Tanaka notes, "there was no money involved. Given the pro-bono nature of the project, we all thought that this would be a wonderful opportunity to offer a summer internship position in postproduction digital restoration. My son, Mitchell, was available and interested. Under the supervision of [Athena technical artist] Jorge Martinez, Mitchell worked on the project for approximately 13 weeks."

In his work, Mitchell Tanaka utilized Pixel Farm's PFClean 2013 image-restora-

tion system. He explains, "There were certain [elements] I encountered in the cleanup process that were extremely difficult to differentiate from dust or other artifacts. In order to eliminate only the dirt and scratch artifacts, we manually rectified the shots frame by frame. It was tedious, but it certainly paid off in regards to the level of quality."

For grading of the restored elements, Parker and Tanaka reached out to colorist Kent Pritchett and DI producer Kim Salyer at the now-defunct facility Colorflow. Pritchett is another ILM alum, and since wrapping *Black Angel*, he and Salyer have gone on to co-found post company Color A Go-Go.

Pritchett used Autodesk's Lustre for the two-day grade. "It was a rush job 30 years ago, and it was a rush job again!" he says with a laugh. "My goal was to honor the original color timing [while] using the DI tools we have today. I helped balance the inconsistencies without changing the feel and the look of the film."

The final steps of the restoration included end-credit services by Illumina Studios, the creation of a digital sound mix at Skywalker Sound, the DCP creation at EFilm, and the negative filmout and creation of a print master at Deluxe.

The restored *Black Angel* premiered at the Mill Valley Film Festival in October 2013 — just 11 months after Parker and Tanaka had first reached out to Christian. The screening marked the first time the director saw the restoration's results. "I'm so grateful to them," he says of Parker, Tanaka and all of their collaborators. "It's exactly as we shot it."

The enthusiasm that met *Black Angel's* return has spurred Christian to adapt the story into a feature. "It's the film I've most wanted to make all my life," he says.

Likewise, the short "was a mad passion project," he reflects. "My training, as it were, was to just go out and do it. *Star Wars* was just a ragged band of people trying to make this huge epic from bits and pieces, and *Life of Brian* was the same — it's a low-budget film with an epic intention. It was ridiculous to do what we were doing, but blind faith gets you through. You have to just do what you want to do, and put visions up there on the screen."

Black Angel is available through iTunes and WeAreColony.com. ●



SAVE THE DRAMA FOR THE SCRIPT, NOT YOUR BUDGET.



FROM A GOPRO TO A RED WEAPON, AND EVERYTHING IN BETWEEN,
ARC RENTS EQUIPMENT TO MEET THE CHALLENGES OF ANY PROJECT OR BUDGET.

PROFESSIONAL CINE, VIDEO & PHOTO EQUIPMENT RENTAL
We are the ultimate resource for professional cine equipment rental.
Cameras, Lenses, Accessories, Computers, Monitors, Lighting & Grip,
and even the Kitchen Sink. Your producer is going to love this.

Latest Gear. Best Prices. Everyone's Happy.

WWW.ADORAMARENTAL.COM | 212-627-8487



Production Slate



From left: Ezra Bridger (voiced by Taylor Gray), Kanan Jarrus (Freddie Prinze Jr.) and Hera Syndulla (Vanessa Marshall) square off against Imperial forces in the animated series *Star Wars Rebels*.

Animated Allies

By Jon D. Witmer

On a Friday at the end of July, AC visits Lucasfilm's campus at the Letterman Digital Arts Center in San Francisco's Presidio. The entrance to Building B is just past the Yoda fountain. Tracy Cannobio, Lucasfilm's senior manager of animation and franchise publicity, enters the building's lobby — which is adorned with memorabilia big and small celebrating all things *Star Wars* — from the hallway opposite an imposing, life-size replica of Darth Vader, and then leads the way to an unoccupied suite with a view of the bay.

A moment later, Joel Aron hurries into the room with a Leica M digital camera slung over his shoulder and a MacBook Pro laptop under his arm. This marks a rare occasion when he's fitted his Leica with a 21mm lens; as he explains, "I walk around with a 50 on my camera religiously." Aron is the CG lighting and effects supervisor on the Disney XD animated series *Star Wars Rebels* — as well as an avid stills photographer, evidenced by his ever-ready camera — and he's about to carve two hours for this interview out of a day in which he still needs to view lighting dailies, prepare a lens guide for this coming Monday's layout kickoff, sign off on what is hopefully

an episode's final retake, give one last look to another episode's color grading, and eat lunch. "It's a Friday," he says, as though without a care in the world. "Overseas studios are asleep."

Rebels takes place some five years before the events of *Star Wars: Episode IV – A New Hope*, and follows the crew of the *Ghost*, a customized freighter captained by ace pilot Hera Syndulla (voiced by Vanessa Marshall). Joining Hera in guerrilla strikes against the Galactic Empire are Kanan Jarrus (Freddie Prinze Jr.), a Jedi Knight in hiding; Sabine Wren (Tiya Sircar), a munitions expert with a penchant for artistic expression; Garazeb "Zeb" Orrelios (Steve Blum), whose oft-needed muscle belies a genuine soft side; Ezra Bridger (Taylor Gray), a Force-sensitive teenager; and the snarky astromech droid C1-10P, better known as "Chopper."

The first season of *Rebels* followed the characters as they gave the Imperial presence on the Outer Rim planet Lothal enough grief to garner the unwanted attention of Grand Moff Tarkin (Stephen Stanton) and Darth Vader (as in the films, voiced by James Earl Jones). In season two, the *Ghost* crew has traveled farther afield and joined up with Phoenix Squadron, part of the burgeoning Rebel Alliance. (At press time, *Rebels* had just been renewed for a third season.) ➤

All images courtesy of Lucasfilm Ltd.

THE BEST JUST GOT BETTER



ALEXA SXT

EASY PRORES 4K RECORDING | IMPROVED IMAGE QUALITY
NEW COLOR MANAGEMENT | SUPER FLEXIBLE ON-SET MONITORING
POWERFUL NEW MEDIA BAY | FUTURE-PROOF TECHNOLOGY

ARRI ALEXA SXT. TRULY CINEMATIC.

Top: Imperial Star Destroyers and TIE fighters give chase to the *Ghost*, the modified freighter that serves as the rebels' home. Bottom left (from left): Colorist Sean Wells, CG lighting and effects supervisor Joel Aron, and lighting-concept artist Christopher Voy. Bottom right: Executive producer and supervising director Dave Filoni.



Rebels was among the first new *Star Wars* content released under the Disney banner after the company's blockbuster purchase of Lucasfilm in 2012. To get the show to air in a timely fashion, its development was decidedly short; as a result, its workflow bears a striking resemblance to the one that had been refined over seven seasons of the animated series *Star Wars: The Clone Wars*. Smoothing the transition between the two shows, *Rebels* has reunited much of the *Clone Wars* production team, including Aron, lighting-concept artist Christopher Voy, colorist Sean Wells, and executive producer and supervising director Dave Filoni, each of whom spoke with *AC* in separate interviews.

Aron was a 17-year veteran of Industrial Light & Magic when, in late 2007, he

was tapped to go overseas and help the Lucasfilm Animation Singapore team learn some tricks with Maya to help speed their output on the nascent *Clone Wars* animated series. Shortly after his return stateside, he was asked to join the show as an effects advisor, beginning with the first-season episode "Trespass."

Aron's role would quickly grow to encompass both effects and lighting, and he credits Don McAlpine, ASC, ACS for preparing him for the latter. The two had worked together when Aron was on set in Australia, working as the visual-effects match-move supervisor on *Peter Pan* (AC Jan. '04), which McAlpine shot for director P.J. Hogan. "For that whole year," Aron says, "I just picked his brain."

As he segued from *The Clone Wars*

to *Rebels*, Aron's first order of business was to immerse himself in *A New Hope* so that he would be able to infuse the new series with a similar style. To complement his repeated viewings of that film, he visited the Lucasfilm archives at Skywalker Ranch and, with the help of the archive staff, pored over the original continuity sheets. Together, they compiled a document that lists the lens used for every single setup in the film. For *Rebels*, Aron says, "I stick with the same theories based on what George [Lucas] and Gil [Taylor, BSC] did on *Episode IV*."

Aron works with simulated VistaVision optics — the default in Autodesk's Maya, which is used for the majority of the workflow, including model construction and lighting. "We render with [Maya plug-in] Mental Ray," he adds, "and we use [The

Bottom-left photo by Joel Aron.



Introducing Ki Pro® Ultra

Powerful Record/Playback at up to 4K 60p

Ki Pro Ultra is a next generation 4K/UltraHD/2K/HD capable Apple ProRes file-based video recorder and player with broad support for video formats and frame rates (up to 4K 60p) and flexible input and output connectivity, including 3G-SDI, Fiber and HDMI. Designed to be either portable or rack-mountable with a half-rack wide 2RU high dimensions, it's well suited for use in studio/truck environments in addition to on-set and even digital signage applications. The Ki Pro Ultra answers the growing demand for 4K and UltraHD capable recorder products with full support for current HD projects.



Incredible Connectivity

Ki Pro Ultra offers a wealth of industry standard connectivity, including 3G-SDI, Fiber and HDMI inputs and outputs, AES and analog XLR balanced audio, LTC, RS-422 and LAN. All outputs are active all of the time. Drive your video and audio up to 10km via multi-resolution Fiber.



Rollover Recording

Ki Pro Ultra captures directly to rugged and reliable AJA Pak SSD media. Pak1000 is the perfect companion for Ki Pro Ultra offering 1TB of fast SSD media for up to 4K recording at 60p in ProRes HQ. Twin media drive bays provide rollover recording, for unprecedented capacity on any project.



Take Control from Anywhere

Ki Pro Ultra features a beautiful high resolution HD display for pristine monitoring of your material, and serves as your interface to Ki Pro's familiar and intuitive menu system. When remote from Ki Pro Ultra, utilize the fast LAN connectivity and access the internal webserver from any web browser on any OS.



Daylight wanes as Grand Moff Tarkin (Stephen Stanton) and the Grand Inquisitor (Jason Isaacs) capture Kanan in the first-season episode "Call to Action."

Foundry's] Nuke for compositing. We try to keep the software list low, because it allows us to be agile."

Even more so than *A New Hope*, the overarching inspiration for the look of *Rebels* is the concept art Ralph McQuarrie produced for the original *Star Wars* trilogy. "The real task became, 'How are we going to translate [McQuarrie's style]?' " Filoni says. "Joel worked closely with Kilian Plunkett, my art director and lead designer, as far as texture and surfacing goes [and] how much reflection we would need. Something Kilian and I gravitated toward was Ralph's line work — he did a lot of pencil lines on his paintings. So instead of a lot of geometry in our CG models, we incorporate a lot of surface-drawn lines, which give a nice hand-rendered feel and the [illusion] of detail, which works well for our pipeline and rendering ability."

Alongside this technique, the production also employs a custom shader, which is applied as a surface material to the characters. As Aron explains, "The shader used for the skin is a three-tone shader, like a 'toon shader.' When you apply contrast to it in color correct, it flattens, which is exactly

what we want — like a [Hayao] Miyazaki or Ralph McQuarrie image."

Another aspect of the McQuarrie style is deep focus, which comes naturally to animation, as the CG lenses aren't beholden to the rules of real-world optics and their depth-of-field characteristics. However, Aron keeps a few tricks up his sleeve for specific shots that might otherwise call for an out-of-focus background. For example, he explains, "If we're up [close] on Ezra and he's using the Force, I like to drop the background brightness to take interest off the background and subtly simulate depth of field. And whenever I use a lens above the 100mm, I'll ever so subtly add a circle blur [to the background], which simulates circles of confusion."

One of the most pronounced stylistic departures from *The Clone Wars* is the change in aspect ratio from 2.39:1 to 1.78:1. "I have to say, that was a downer," Filoni opines. "We all miss [2.39:1]. It's cinematic; there is no substitute for it. But, very simply, we made the change because it's less to render. [With] 16:9, we can get things done a little faster."

The narrower aspect ratio required

the crew to rethink their approach to framing, and as Filoni notes, "there are considerations for characters." For example, although the taller frame makes it easier to compose Darth Vader alongside his decidedly shorter castmates, "Joel and I learned very quickly that if you shoot Vader from a strange angle, he won't look like the Darth Vader you remember," Filoni continues. "If you shoot him from the side, you realize how big that helmet is and how narrow his body is — especially on our animation model. You have to be aware of all of that in your animated actor."

Vader requires particular finesse when it comes to reflections, which *The Clone Wars* eschewed completely but *Rebels* incorporates sparingly. Years ago, Aron was on set for a series of Burger King commercials that featured the iconic Dark Lord of the Sith, and that real-world experience informed his approach to *Rebels*' CG Vader. His solution, he says, is to light Vader "like a car commercial." Working in Photoshop, Aron painted a cyclorama that he then took into Maya for lighting. "Wherever Darth Vader goes, he's got that cyc," Aron says. "Otherwise, he reflects the room



CW SONDEROPTIC

Emotional images for modern cameras



SUMMICRON-C T2.0

CW Sonderoptic GmbH
Wetzlar, Germany | Los Angeles, USA

www.cw-sonderoptic.com
sales@cw-sonderoptic.com



In the season-two episode "Relics of the Old Republic," Imperial walkers fire on a Clone Wars-era All Terrain Tactical Enforcer, which has been heavily modified for personal use by a trio of aging clones.

and looks like a CG chrome ball."

As the show's CG character and spaceship models were finished and painted, Aron did a series of lens tests with each, seeing how it looked at various distances when "photographed" with various focal lengths. "The 50mm is always my go-to," he says. "When I need to go wide, it's usually the 35mm. I'll usually use the 75mm on Sabine or Hera, but I won't do the 75 on Kanan, because it narrows his head a little too much. Whenever Ezra starts to use the Force, I go 75mm on him. When you cut to the object he's using the Force on, I match and go 75mm there, too. As soon as the Force is broken, I'll go to a 50mm so you feel that little punch."

"Spaceships are always [shot with] a 50mm or 75mm, and that comes from talking to [ILM and original-trilogy veterans] Dennis Muren and Paul Huston," Aron continues. "Whenever we see a Star Destroyer, I like to go even longer, like 100mm."

For each episode of *Rebels*, the design team sets to work on any new assets the story will require — sometimes even before the script has been locked. Once approved, the designs go to digital-assets

supervisor Paul Zinnes and his team to be rigged as CG models. Simultaneously, the storyboard artists begin working in close collaboration with Filoni and — unless Filoni is directing the episode himself — the episodic director.

The finished storyboards allow Aron to pick the lens for each shot. "If I have any questions about how [the shot is] drawn, I'll open up the scene in Maya, throw lenses on it and see how it could work, whether I need to remove any geometry or float a wall to get the shot we need," he explains.

When it comes to placing the virtual camera in the CG environment, *A New Hope* again serves as the crew's guide. In that film, Filoni observes, "the camera never is in a place that you couldn't really get it. A lot of the film is shot on sticks — it's almost documentary-feeling. So I'm always on our episodic directors to say, 'How can we get that feeling of watchfulness, so that it makes the world of our animation feel real?'"

As they had on *The Clone Wars*, the team at Lucasfilm is again collaborating with Taipei, Taiwan-based animation studio CGCG; season two of *Rebels* has seen the addition of Saigon, Vietnam-based studio

Virtuos-Sparx. "CGCG does 17 of the 22 episodes in the season, with Sparx picking up the other five," Aron explains. For each of its episode assignments, each studio assembles a layout, which translates the 2D storyboards into 3D shots, establishing the camera's position and movement, confirming the blocking of all action within the frame, and generally ensuring that everything is in place for animation supervisor Keith Kellogg's team to begin actually animating the episode.

"The biggest thing in animation is how to translate a 2D storyboard into a 3D world," Aron stresses. "This is when we'll talk about how the camera moves. There are things that may look good on boards but don't translate well in 3D; we have several meetings about layout just to make sure it's right."

The storyboards also serve as the foundation for lighting-concept paintings, which Voy creates in order to set a template for the lighting design and color palette of key moments in each episode. Aron will typically select 15 or so such key frames from the storyboards, and then Voy will take those gray-scale storyboards into Photoshop and paint directly over them, incorporating

Uncompromised Creative Freedom

Pioneering LED Lighting Platform adopted today as the main lighting fixture in Hollywood Studio Motion Pictures.

Announcing DS3 Beam.



Used by:

Independence Day:
Resurgence

The Huntsman

Star Wars:
Rogue One

The Neon Demon

The Lion
Dawn

Queen of the Desert

True Detective

Hawaii 5-0

 **Digital Sputnik**



Based on storyboards selected by Aron, Voy paints lighting concepts such as these to establish the desired tone and palette. These "LCs" are then given to the lighting artists at overseas studios CGCG and Virtuos-Sparx to use as a guide as they light the actual animation.

assets from the design department and following notes about lighting and effects that came out of discussions with Filoni, Aron and others.

"The interplay of light and dark is the unconscious part of [the second] season," Filoni notes. "Ezra's struggling with becoming more powerful. When you become more powerful, there's always the danger of seizing that power for yourself, even when you think you're doing good for other people — Anakin went through that [in the prequel films]. So, especially in the Jedi-centric episodes, you'll often see people standing at the edge of a shadow. That's all very orchestrated."

Voy, who joined the production of *The Clone Wars* at the same time as Aron, notes that the lighting concepts on *Rebels* are "pretty similar to what we did on *Clone Wars*, but with a shorter turnaround." For each episode of *Rebels*, Voy has two weeks in which to make all of his lighting concepts and assist the overseas studios with the matte paintings that will be composited into the final animation. "I'll try to get my first pass of everything finished in a week," he explains, "and then use the next week to do any revisions we need."

Asked how the crew decides what frames will get a lighting concept, Voy offers, "Joel will have an idea of what shots he wants to get a pass at because they might be especially difficult — if there's a complex effect, or if we have a new set, we'll try and get a painting. So he picks the ones that might [require] the most back and forth with the overseas studios, where having a painting can help hammer it out on our side so we can send it over and say, 'Try and match this as closely as possible.'"

Before the lighting artists at CGCG and Virtuos-Sparx set to work lighting the raw animation, Aron leads the overseas team through a "lighting kickoff." As Aron explains, "We go through every single shot and I explain how the characters should be lit, how bright the background should be, where the focus should be."

"I dwell more on the first time you see a character than anything," he emphasizes. "The first time you see any character in any episode, I want it to look like a portrait. I don't care what the light is on the set; I want a top-down 45-degree key [light]

B&H - The leading retailer of the Latest Technology



BandH.com



Shop B&H, where you will find all the latest gear at your fingertips and on display in our SuperStore.



Visit Our SuperStore
420 Ninth Avenue, NYC
877-657-9686
212-502-6375

www.BandH.com
Where you will find information on over 400,000 items

Download the B&H App



A Anton Bauer Digital 90 Gold Mount Battery
#ANDIG90GM
\$269⁰⁰

E Sony Alpha a7RII Mirrorless Camera
#SOA7R2
\$3,198⁰⁰

I Canon EOS C100 mkII Cinema EOS Camera with 24-105mm f/4L
#CAC100AF2E24
\$5,999⁰⁰

B Lowel PRO Power Daylight LED Light
#LOGS100A
\$609⁹⁵

F Canon CN-E30-105mm T2.8 L SP Cinema Lens
#CAE30105PL
\$23,275⁰⁰

J Panasonic Lumix DMC-GH4 Camera with Interface Unit
#PADMCGH4BK
\$2,297⁹⁹

C Blackmagic Design Production Camera 4K
#BLPRDCCAM4K
\$2,995⁰⁰

G Elvid 7" FieldVision Pro Monitor with Scopes
#ELOCM7PWV
\$899⁰⁰

K Magnus VT-400 Tripod System with 2-Way Fluid Pan Head
#MAVT400
\$129⁹⁵

D Canon CN-E 135mm T2.2 L F Cinema Prime Lens
#CAE135EF
\$4,950⁰⁰

H Porta Brace CTC-3 Traveler Camera Case
#POCTC3
\$250⁸⁵

L DJI Inspire 1 Quadcopter 4K Video and 3-Axis Gimbal
#DJINSPIRE1
\$2,828⁴⁸

Cash in or Trade up
Used Equipment
We Buy, Sell, and Trade



Visit www.BandH.com for the most current pricing

*Applies to In-Stock Items. Some restrictions may apply. See website for details. NYC DCA Electronics Store Lic. #0906712; NYC DCA Electronics & Home Appliance Service Dealer Lic. #0907905; NYC DCA Secondhand Dealer - General Lic. #0907906. © 2015 B & H Photo & Electronics Corp.



When the studios deliver their first pass on the lighting (top), Aron often provides feedback in the form of a paint-over (bottom). In this example from the season-two episode "Brothers of the Broken Horn," Aron focuses the attention on Ezra's face and adds "white Avery dot" highlights to the character's eyes.

that matches the tone of the room."

Eye lights are also one of *Rebels'* stylistic tropes. "Our characters should always look like we put a tiny white Avery dot on their eyes," Aron says. The lighting artists utilize a rig within Maya that allows the key light to easily drive where these specular highlights appear. "You'll notice the iris color moving, as well," Aron adds.

Rebels presents a particularly diverse array of skin tones, from the green-skinned Hera to the orange-skinned Ahsoka Tano (Ashley Eckstein), the erstwhile padawan of Anakin Skywalker and a key organizer of the early Rebellion. To accommodate that range, Aron says, "we usually try to keep

the [key] lights as neutral as possible." In communicating color temperature with the lighting artists, he avoids Kelvin numbers in favor of referencing *Voy*'s lighting concepts and examples from films. "What I've found on both *Clone Wars* and *Rebels* is that it's best to get the shot in the ballpark, and then Sean and I will push it towards our final look in the grade," Aron explains.

When it comes to lighting ships in space, "you always see the sun side," Aron notes. "Whenever you saw the *Millennium Falcon* flying, it was always lit. We do the same thing with the *Ghost*.

"As soon as you get into a cockpit, it doesn't matter [where the light is coming

from]," he continues. "I just want to see the light moving." Aron's cockpit-interior lighting incorporates gobos that he makes in Photoshop for use in Maya. "I do that incessantly," he offers.

The manner in which the CG lights are shaped and controlled requires a unique toolset as compared to live action. Aron explains that he manipulates controls within Mental Ray so that, for example, "if I've got a spotlight, I can make that spotlight have a quadratic falloff, a linear falloff or no decay. So the light can beam like a laser, or it can fall off like it's being shot through a grid or another diffuser."

To communicate the desired levels of brightness in any given frame, Aron predominantly relies on light ratios. "I target 2:1 or 3:1 when giving notes," he explains. By taking this approach, he adds, "I can focus more on the actual lighting composition of the shot and not worry too much about exact stops, knowing that I will be working with Sean in the final grade to push contrast back into the images."

As the lighting starts to come in from the studio, Aron, Voy and others will review the work in a lighting-dailies session. Aron offers his feedback to the studio in the form of notes and paint-overs. For the latter, he uses Photoshop and a Wacom Cintiq display to paint the desired changes directly over the submitted frame. The artists on both sides of the Pacific utilize Tweak Software's RV playback and review application, which allows the lighting artists to compare their submitted shots with Aron's paint-overs. "I only have about 5 or 10 minutes for each paint-over," Aron explains. "I usually do 10 a week, and it sometimes goes up to about 20 or 30."

Concurrent with the lighting, Aron shepherds the series' effects, including atmospherics such as smoke, haze and clouds, which "can get very expensive," he says. To cut down on those costs, he adds, "we go right back to the 2D method. We can't let the computer do everything!"

As an example, he points to the season two-episode "Relics of the Old Republic," in which our heroes — who have allied with aging clones Rex, Wolffe and Gregor (all voiced by Dee Bradley Baker) — are pursued through a blinding dust storm by a trio of hulking Imperial



THE REVENANT (2015)

Captured with ALEXA 65 for selected sequences



CAROL (2015)

Captured with ARRIFLEX 416 cameras

Congratulations

Emmanuel Lubezki ASC, AMC and Ed Lachman ASC

on your achievements.

From 16 mm film to 65 mm digital, we've got you covered.

www.arrirentalgroup.com

ARRI Rental



Aron's paint-over (bottom) for this frame from the season-two episode "The Future of the Force" directs the eye toward Kanan and Ezra as they round the corner and emphasizes their placement at the edge of darkness.

walkers. He explains, "I taped my iPhone to my tripod; I poked holes in a cup; I grabbed salt, sugar and Splenda, and put it in the cup; I took two desk lamps; and then I shot slow motion." The iPhone captured the "dust" — backlit and shot against a black backing — as it fell through the holes in the cup. "Once CGCG was done with most of their dust stuff," he adds, "I took this element, turned it sideways and laid it over the top [of the animation]. And it works really, really well."

One of the first effects Aron had to crack for *Rebels* was the look of the show's lightsabers. Here again, his close analysis of *A New Hope* paid dividends. For that film, the lightsaber hilts were connected to spinning dowels covered in a reflective tape that

would appear to glow, from the camera's perspective. Although rotoscoping would ultimately carry the effect across the finish line, the movement of the spinning dowel is still evident — for example, in the medium shot of Obi-Wan Kenobi (Alec Guinness) after he quite literally disarms the threatening Ponda Baba in the Mos Eisley cantina. Aron worked out the cycle at which Kenobi's saber blade spun and flicked back and forth in this scene, and that cycle was then re-created in Maya, where it is applied to all of the lightsabers seen in *Rebels*.

"Joel is my wizard," Filoni enthuses. "How he manages to get so many shots done so beautifully is still mind-blowing to me. It spoils you as a director; you just want to keep coming up with more challenging

environments. But that's Joel's character — he doesn't want to say 'no.' He's one of those guys from the old school of ILM [who believe] that the best kind of problem is the one that we don't have a solution for, so they come up with it."

Making a season's worth of 22-minute episodes is far from a linear, prep-through-post experience for the *Rebels* team, as multiple episodes are in various stages of production at any given moment. "If I were to run my finger down the schedule on today's date," Aron explains, "I would cross over 14 episodes that are in progress in one state or another. We have nine weeks for lighting and effects per episode; it works out that four episodes are in the lighting and effects phase in the schedule at once. Add in to that the four prior episodes that are in the retake phase — cleaning up or adding shots to the final edit based on notes from Filoni or Disney — and on a good day, I'm reviewing shots from eight episodes."

Once the last retake is in hand, Aron can sit down with Wells to begin the color correction. Wells works on site at Lucasfilm, where he uses Digital Vision's Nucoda to grade the production's native 16-bit EXR files and deliver a 1920x1080 10-bit DPX for mastering and the creation of all of *Rebels*' requisite deliverables, including files for broadcast, download and Blu-ray. While grading, Wells alternately references a Christie CP2215 projector, a Flanders Scientific AM420 monitor and a Panasonic ZT60 65" plasma television.

Wells is typically given five days to grade an episode. "It's a little more than live action would be," he says, "but we do a lot more compositing-style adjustments in the system to [further] sweeten it as we go."

After working in visual effects at The Orphanage, Wells joined the production of *The Clone Wars* at the beginning of the second season, starting with the episode "Hidden Enemy." He graded every subsequent episode through the series' conclusion, and has been with *Rebels* from the start. In the time they've spent working together, Aron says, "we came up with a shorthand for what we need to do. I'll give him notes like, 'Slam left, swell bottom,' so Sean can just fly."

Asked what it means to "swell" an

K 5600[®]

L I G H T I N G

www.K5600.com



Photo: Jonathan Hickson
Instagram: @diamondviewstudios



Photo: David Jeffries
Instagram: @davidjeffries



Photo: David Stollery
Instagram: @electric_skillet



Photo: Geoff Taylor
Instagram: @gezess

BUG-A-BEAM

BEAMER

BIG EYE FRESNEL

VERSATILE & TRENDING

EXPLORE YOUR OPTIONS:



@k5600lighting



Top: Former Jedi padawan Ahsoka Tano (Ashley Eckstein) wields her dual lightsabers for the nascent Rebel Alliance. **Bottom:** The rebels are hounded by the Fifth Brother (Philip Anthony-Rodriguez) and Seventh Sister (Sarah Michelle Gellar), two members of the shadowy, Jedi-hunting Inquisitorius.

image, Wells laughs and explains, “People call me ‘Swells,’ so Joel took that. It’s basically a heavy vignette; usually we throw it on the top and bottom of the screen to help pull the center out. It’s not like we invented an optical technique; it’s just when he says it, I know the shape, the feathering and the aggressiveness of the vignette.”

The Nucoda is also used to add

simulated film grain to the animated image, which works in concert with edge dithering that’s applied during rendering to break up high-contrast edges. “Usually in CG, you’ll have these crisp edges, but if you edge-dither all the high-contrast lines and then put grain on top of [the image] in post, you get this film look,” Aron explains.

Wells adds, “Joel’s instinct is to not keep everything ‘CG perfect,’ where you

know it came from a computer. We also do a lot of highlight blooming and other things to soften and gnarl up the image a little bit before it goes out, so it has a ‘feel.’”

With his dailies session looming — after he’s already postponed it once so as to not have to cut short this interview — Aron racks focus to his collaborators. “I can’t speak enough about the team that I work with,” he stresses. “There’s no individual who really pushes this show in any direction — other than Filoni, and even then he’ll say that we couldn’t do what we do without being that team.”

In turn, Filoni offers, “I think Joel and Chris and Sean would all agree that we were very fortunate to have George Lucas himself instruct us along the way. He always used to tell me that he spent so much time working with us so that one day we could do it without him — and I always thought he was joking, and then that day came. But my team and I embraced the opportunity. I mean, it’s the proper apprenticeship path, right? You eventually have to take these steps on your own, and I think we’ve taken them well.” ●

INTRODUCING

The world's lightest geared rotating
138mm Circular Polarizer
"and only"
4x5.650 Variable ND tray
on the market!

TIFFEN® *Multi Rota Tray*



AND

TIFFEN® *138mm Variable Neutral Density*

Unique, Versatile, Flexible 2-8 stops
of neutral density control.



The Tiffen Company • 90 Oser Avenue, Hauppauge, NY 11788
1-800-645-2522 • 631-273-2500 • tiffen.com



A Visit to the Set

The crew of *Star Wars: The Force Awakens* takes *AC* on a tour of its operations at Pinewood Studios.

By Noah Kadner



A relatively long time ago in a galaxy across the pond, *AC* editor-in-chief and publisher Stephen Pizzello and I had a fanboy's dream come true during a visit to the set of *Star Wars: The Force Awakens*. We toured the production on Sept. 18, 2014, at Pinewood Studios outside London. What follows is a first-person account.

We arrive at Pinewood Studios in the early morning and sign the obligatory nondisclosure agreements amid heavy security. We also receive special guest badges 001 and 002, labeled with the production's code name: "AVCO" (after the Los Angeles theater where an 11-year-old J.J. Abrams watched *Star Wars: Episode IV—A New Hope* in 1977). At the time of our visit, the film is still being referred to simply as *VII*. We're escorted to a meeting with Lucasfilm's unit publicist,

Vanessa Davies, and her assistant, Mary Gouldsbrough.

Office walls are adorned with retro posters emblazoned with a confidentiality slogan: “Loose Lips Bring Down Starships,” featuring the hand of Darth Vader choking an Imperial officer, who is clutching blueprints. After a chat regarding the overall status of production, which is scheduled to wrap in early November, Davies leads us around the massive soundstages and side streets of Pinewood toward the back lot.

On a flat sandpit the size of a couple of football fields, the production has created a snowy plain with moguls, rock formations, snow drifts and blinds that convincingly blend with a partly cloudy, late-summer English sky. At the base of the snow plain, we see a large portion of a sinister-looking gray

bunker with flashing red lights and steam vents. Davies informs us that this is Starkiller Base, the planetary headquarters of the First Order — formerly the Galactic Empire. To further sell the environment, special-effects technicians blow ice and paper snowflakes sourced from Snow Business.

Executive producer Tommy Harper notes that Abrams and director of photography Dan Mindel, ASC, BSC felt they could pull off snow on a back lot after their successful experience with the similarly snowbound Delta Vega sequence from their first *Star Trek* film (*AC* June '09). A line of cones neatly demarcates the snowy plain from a desert-village setting shot earlier in the production, and reveals the truly impressive reality-bending the production has been able to accomplish with its real-for-real approach.

Harrison Ford (Han Solo), John Boyega (Finn) and Chewbacca stunt performer Joonas Suotamo await a take. They hold various weapons and are clearly arriving to infiltrate and sabotage the enemy base. We briefly meet and shake hands with Abrams and Mindel, who cordially welcome us to their set. Davies whispers that we're the first journalists permitted to visit.

The outdoor scene is lit relatively simply with two heavy construction cranes hoisting large overhead 70'x40' frames with silks and flags to control the ambient sunlight. A single Sunray 12/18K HMI unit diffused through a 10'x10' silk frame plays as the main light source. Later, a smaller 1,200-watt HMI is bounced against a white 5'x5' Grid Cloth to provide fill and eye light for close-ups at the corner of the Starkiller Base entrance. ➤



Opposite and this page, top: Finn (John Boyega) and Rey (Daisy Ridley) befriend the legendary Han Solo (Harrison Ford) aboard the *Millennium Falcon* in *Star Wars: The Force Awakens*. Bottom (from left): Robbie Bryant; Alex Bender; Robert Palmer; Alex Collings; Alex Teale; Serge Noffield; Phil Carr-Forster; cinematographer Dan Mindel, ASC, BSC; Colin Anderson; and Simon England on the *Falcon* set at Pinewood Studios outside London.

■ A Visit to the Set



Top: Chewbacca (Peter Mayhew) and Solo reclaim their beloved ship. Middle: A-camera operator Anderson readies the Imax camera for a scene aboard the *Millennium Falcon*. Bottom: BB-8 checks if the coast is clear as he carries out an important mission with his new allies.

Solo sports a winter coat similar to the one he wore on Hoth during *The Empire Strikes Back*, along with his trademark, Mauser-like BlasTech DL-44 blaster. Chewbacca carries his traditional bowcaster and a satchel full of explosives, no doubt intended for First Order baddies. Between takes, the Norwegian-born Suotamo quizzes Ford about his experiences in Norway while filming the Hoth sequences for *Empire* in 1979. Ford listens intently as Suotamo describes a typical Norwegian winter. Ford replies that his memories of Norway were also good, but quite a bit less comfortable than today's balmy weather.

Steam machines simulating smoke escaping from vents in the bunker's interior emit a loud screech as the pressure is relieved. The noise causes cast and crew to instinctively cover their ears, prompting a quick apology from 1st AD and co-producer Tommy Gormley for the lack of advance warning.

The team moves quickly from setup to setup, averaging six to 10 takes per shot and using two to three Panaflex Millennium XL cameras. For the bright outdoor sequence, the cameras are loaded with 1,000' magazines of Kodak Vision3 50D 5203 35mm film. One camera rides a 50' Technocrane mounted to a Panaconda off-road rig



Top: The crew readies a sequence in which Finn, Chewbacca and Solo have been captured outside of Maz Kanata's castle. Middle: Mindel measures the light for a battle scene. Bottom: Ford observes the proceedings from beside the crane-mounted camera.

for easy repositioning, while another is on a standard dolly and track.

In a sharp contrast to the complex DIT stations of most modern digital productions, the video village consists of tents with simple video taps for both the main and splinter units. Producers and script supervisors view takes on plasma screens fed by QTake video-assist software with video signals routed through Blackmagic Design Smart Videohub 12x12 switchers.

We watch two scenes being filmed — slightly out of sequence — around the snowy First Order bunker. In the first, Solo, Chewbacca, Finn and Rey (Daisy Ridley) arrive at a vantage point outside the bunker. Although Starkiller Base is even larger than the Empire's Death Star, it does have a weakness — seemingly the case with all villain technology. As the characters discuss the vulnerability, the camera dollies into a close-up on Ford and he gives his classic knowing smirk — an expression instantly recognizable to any fan of Han Solo (or Indiana Jones).

Ridley wears a beige costume suited to the deserts of Jakku — but less so the snowy climes of Starkiller Base — and carries a stormtrooper's blaster, updated from the original trilogy to



A Visit to the Set

Top: Supervising animatronics designer Gustav Hoegen works on a headpiece. Middle: Droid builders Lee Towersey (gesturing) and Oliver Steeples (far right) discuss various droid heads with creature-effects supervisor Neal Scanlan (left) and director J.J. Abrams. Bottom: Puppeteer Olly Taylor studies some of the film's creatures.



feature a white casing with black barrel. In his leather jacket, Boyega would fit right in at the Mos Eisley cantina. Dangling from his side, in tantalizing proximity, is a lightsaber that looks remarkably like the one Luke Skywalker inherited from his father, Anakin.

In the scene that follows, slated as "V310," Finn, Chewbecca and Solo have made their way to a side entrance of the bunker, where they search for a way in. "We'll use the Force!" Finn optimistically suggests, prompting Solo's exasperated reply: "That's not how the Force works!" Then Chewbacca lets out a growl that only his longtime friend can interpret. A cranky Solo turns to his fur-covered companion and gripes, "Really, you're cold?!"

Mindel periodically checks the sky with a glass contrast loupe as the sun peeks in and out of scattered clouds, and temperatures hover near 90 degrees. Meanwhile, Ridley and Boyega joke with crewmembers — one of whom wears stormtrooper leggings and the other a T-shirt featuring Chewbacca as Che Guevara — as the next shot is briskly prepared.

Between takes, Ford sits nearby



PARALINX ACE

TX < 150g
RX < 160g

300FT
RANGE

UP TO 4
RECEIVERS

UNCOM-
PRESSED

REAL TIME:
<1MS
DELAY

AFFORDABLE **ULTRALIGHT WIRELESS SDI**

SDI: \$1799.95 HDMI: \$1299.95

WWW.PARALINX.NET

•| At the Helm •|

J.J. Abrams — director, co-writer and producer on *The Force Awakens* — discusses his collaborative efforts with Dan Mindel, ASC, BSC and the creative team at Lucasfilm to give the *Star Wars* universe a modern upgrade, while keeping the saga firmly rooted in its hallowed history.

American Cinematographer: Tell us about the importance of having a non-cynical perspective when taking on a project like *The Force Awakens*.

J.J. Abrams: Since I was 11 years old, when I saw the first film for the first time, what *Star Wars* had at its core was a sense of possibility, optimism and hope. So the approach had to be in that spirit, in an authentic and not in a Pollyannaish way. From the very beginning, working with Lawrence Kasdan — one of the [saga's] original storytellers — this was about embracing a spirit that we love so desperately.

You have collaborated on three other films with Dan Mindel — two *Star Trek* films and *Mission: Impossible III*. What draws you to work with him?

Abrams: One of the things that I love about Dan, [beyond] his versatility, is his love of film itself, and his appreciation for the look of anamorphic lenses. There's a kind of aesthetic that he and I both get excited about. I learned so much from Dan on *Mission: Impossible III*, which was my first movie. He was the first cinematographer I worked with on a feature, and his generosity and patience with me were sort of stunning — and something for which I am still so grateful. He was an amazing collaborator from the very beginning, and we immediately found ourselves laughing more often than not, and celebrating a great shot. We found ourselves in such sync. Dan is someone who I consider to be not just an incredible genius and a brilliant



cinematographer, but also a dear friend.

How did you and Dan go about giving *The Force Awakens* a look of realism and authenticity?

Abrams: Part of it is location shooting — making sure that we were on actual sets and builds and locations wherever possible. The ability to shoot actual locations — in Abu Dhabi, or in the forests of Wales, or on [Skellig Michael] in Ireland, or getting plates in Iceland — is enormous, and something we're really grateful for on this movie. And part of it is embracing and encouraging the unexpected. Whether it's atmosphere or natural light, it's embracing the things that you sometimes desperately try to re-create in post, which [in those cases] end up being a lot of time spent trying to make something that nature is often giving you for free.

Kathleen Kennedy, president of Lucasfilm, has talked about how concept art would be brought into story brainstorming sessions, and that an image might inspire an idea that would take the story in a different direction. How did this scenario apply to *The Force Awakens*?

Abrams: One of the great opportunities on this movie was working with

Rick Carter and Darren Gilford, our production designers. I brought Rick into the story process at the very beginning, probably because I knew how inspiring Ralph McQuarrie's designs were to George Lucas when he was working on the original films. It felt like we had such a brain trust — and I should also say a 'soul trust' — in Rick and Darren. Rick is such a dreamer and such a glorious connection-maker, with a capability to hear what we were talking about, and then go work on something and bring it in and show us — and it might have been a detail we would have forgotten or overlooked, but Rick visualized it and brought it to life. Or he'd bring in something that we wouldn't have thought of. It was an inspiring thing to see the work of such extraordinary conceptual artists and designers. And to begin to identify which images could apply to the movie, just because you knew it and you felt it was right, was as informative to how our story was going to unfold as anything. All we're saying is that the best idea wins. And the sooner you have smart people helping and working on something from any angle, the better.

How was *Episode VII* influenced by the work of original-trilogy concept artists such as Ralph McQuarrie and Joe Johnston?

Abrams: When you look at a triangular Star Destroyer, or the sphere and two planes of a TIE fighter, or the literal 'X' of an X-wing, there was such a 'primary color' approach to some of these things, which were then rendered and executed in such incredible detail. The wear and tear and the sense of practicality to these fanciful designs were really inspiring. Some things needed to be embellished; you want to see some adjustments, some changes, some advances for things to be believable in a story taking place nearly 40 years after the first movie. The design of the movie — from locations to set design to props and wardrobe — all of it, even the casting of it, was about 'What feels right? What feels like it is the *Star Wars* movie that's relevant for "now"?'.

Were there any sets on *The Force Awakens* that made you particularly nervous, where you asked yourself, 'will this really work?'

Abrams: Probably because I was so obsessively critical of the process, I think every set had a little bit of that. I guess for me, the thing that was the most surprising was working on the set of the [*Millennium*] *Falcon*. Because it was a set that I knew so well as a fan, and I'd seen some of my favorite scenes ever on that set, what I found myself feeling was that the scenes we were shooting needed to be as good as the set was. It wasn't so much that I was concerned that the set might or might not work, but the set itself challenged the scenes.

The overriding theme of *Star Wars* is the balance between good and evil, and light and dark. George Lucas, in fact, once said, "Do unto others" is the philosophy that permeates my work.' What are your thoughts on those ideas?

Abrams: The idea of good versus evil, light versus dark, is certainly the core of *Star Wars*. There's the temptation of power and greed — the Dark Side — and the sacrifice and nobility of fighting for justice, [which is] the Light. These are the tenets of the *Star Wars* universe, and all the props and gizmos and space-ships are incredibly cool, but the core and heart of the story is family and which path you're going to take. The beauty of working on this movie was getting to play in this incredible sandbox that George Lucas created. Everyone I can point to who worked on this film approached it from a place of reverence on the one hand, and on the other hand the determination to do it proud and to tell that story of good versus evil. And like the main characters of the film, we worked hard to make sure that the Dark Side gets its ass kicked!

— Andrew F. Fish

For an extended version of this interview, visit www.theasc.com in February.

DMG Technologies presents

LUMIÈRE
FOR MOTION PICTURES

IT'S
TIME
TO
switch

Soft. Bright. Light

LEDs are not the future...
they are the present

dmglumiere.com



A Visit to the Set



Top: Multiple cameras are rigged to an X-wing cockpit on a gimbal rig. Middle: Chewbacca, Solo and Finn prepare to infiltrate Starkiller Base. Bottom: Concept art for the new "flametrooper" uniform looms behind constructed stormtrooper helmets.



chatting on his iPhone, resting the still-mending ankle that was broken by the door of the *Millennium Falcon* just six weeks before our visit. For medium and close-up shots, he wisely trades his boots for purple Asics sneakers to help facilitate his recovery — which, as every fan knows by now, was amazingly quick.

Breaking from the action at Starkiller Base, Gouldsbrough whisks us off to other areas at Pinewood. As we walk, she spots actor Roger Moore rocketing by in a golf cart toward the snow set. Stephen and I wonder aloud if, given Moore's long tenure as James Bond, he's been granted a lifetime pass to visit Pinewood's stages.

We stop off at the production's creature shop, which is housed in a building permeated by the "foul stench" of recently fabricated foam rubber; the building's security guard proudly states, "I don't even notice the smell anymore." The company credo of maximum verisimilitude is on display as we spot a huge number of practical creatures in various degrees of preparation, a menagerie that might have been accomplished digitally in the trilogy of *Star Wars* prequels.

At the entryway, just beyond the front door, two R2-D2s — complete with the extensive weathering one would expect from 30 years of adventuring since the timeframe of *Return of the Jedi* — stand ready to save the day. Creature sketches and designs adorn the walls, and many finished masks are covered in protective tarps.

A large creature, seated in a throne-like chair and clutching a chalice, is easily twice the size of a typical human; named "Grummgar," it requires several puppeteers to operate. The largest beast in the shop is the "happabore," which looks something like an elephantine hippopotamus with the snout and teeth of a wild boar. It's clear how the scale and detail of both the masks and animatronic creatures will help bring the requisite believability to the screen.

Following a flurry of last-



WE ARE
MELS
UNIFIED CREATIVE FORCES

VFX
STAGES
CAMERAS
GRIP + RIGGING
LIGHTING
DOLLY
FRONT END
FILM LABORATORY
DI + VIDEO POST
AUDIO POST

MICHEL TRUDEL

PRESIDENT, MELS STUDIOS

T 514.866.2170 x 301/302 C 514.951.1823
michel.trudel@mels-studios.com

FRANÇOIS GARCIA

VICE-PRESIDENT, SALES CREATIVE SERVICES

T 514.390.3384 C 514.708.4014
francois.garcia@mels-studios.com

PAUL BELLEROSE

VICE-PRESIDENT, SALES BUSINESS DEVELOPMENT

T 514.390.3270 C 514.707.2787
paul.bellerose@mels-studios.com

MELS-STUDIOS.COM

Canada's largest supplier of services
to the film and television industry

■ A Visit to the Set

Right: Scanlan and Abrams discuss one of the creature models. Below, left: Modeler Justin Pitkethly works on an alien arm. Below, right: Sculptor Colin Jackman works on Grummgar, a nefarious patron in Maz's bar.



minute phone calls seeking an additional set-visit approval, Gouldsbrough leads us to M Stage, which contains the full-size interior of Han Solo's heavily modified YT-1300 freighter, the *Millennium Falcon*. An imposing security guard named Devil stands watch over Solo's starship and regales us with stories of bodyguarding everyone from director James Cameron to the president of Peru.

The *Falcon* set consists of two

separate pieces. The first is the ship's cockpit, which is mounted on an elevated platform. The second, much larger section comprises the *Falcon*'s entry ramp, cargo and passenger holds, gun-turret wells, and all connecting corridors.

Climbing up the ramp, we marvel at how the *Falcon*'s interior has been painstakingly re-created from the original trilogy. From the dejarik (or "holochess") table Chewie and R2-D2

once played at in *A New Hope* to the medical bunk Luke healed in after his duel with Darth Vader in *The Empire Strikes Back*, everything's here, as real as life.

Even minor props, like the fuel barrels glimpsed in the background of Luke's lightsaber training sessions with Obi-Wan Kenobi in *A New Hope*, are located in their original positions. Although the cargo hold's lights are partially dimmed, the feeling of immer-

sion into the reality of *Star Wars* is deep. At any moment, we fully expect to be joined by Alec Guinness and make the long-awaited jump to hyperspace.

Devil escorts us to the *Falcon's* cockpit and switches on its interior lights. Naturally, the *Falcon* takes its time coming to life, as the lights flicker before achieving steady brightness. Once inside the cockpit, we see that the switches, levers, sliders and dials all work, down to the center console with its interactive phosphorescent green revolving light indicating a properly functional (for the moment) hyperdrive.

As someone who has watched and re-watched the original trilogy dozens of times, I find the loving attention to detail and the accuracy of every last inch of the cockpit to be truly breathtaking. As we stand with mouths agape, we realize no one will ever believe where we've been, since our NDA forbids us from taking selfies. Devil helps us out of the cockpit and we depart M Stage for our next destination: the splinter unit led by director Roger Guyett and cinematographer Bruce McCleery.

Abrams' childhood friend, actor Greg Grunberg, who traditionally makes a cameo on every Abrams production, is on hand as Resistance fighter pilot Snap Wexley, flying a full-sized mockup of an X-wing cockpit. Grunberg is filmed outdoors on the Pinewood lot with the cockpit portion, a droid socket and small bluescreen all securely mounted onto a large motion base and gimbal. Between pilots, droid handlers swap out different-colored radio-controlled R2-style heads to sell the illusion of a single cockpit mockup standing in for many different fighters.

A powerful custom gimbal designed by special-effects supervisor Chris Corbould rocks Grunberg through multiple axes at high speed, as two onboard Panaflex cameras capture front and side views. Corbould comments that Abrams had asked for a gimbal as one of his first practical

YOUR STORY IN ITS BEST LIGHT



Cineo Lighting
TruColor HS Luminaire
Production Light Kit
Price \$3,740



Arri L5-C
Color LED Fresnel
Stand MDL Light
Price \$2,074.90



Litepanels Astra
1x1 Bi-Color LED Light,
Tungsten-Daylight
Price \$1,350

For more information or to purchase
visit www.adorama.com

Adorama Pro is your complete resource for professional tools,
in-depth knowledge & production support.

SHOP

RENT

PRINT

LEARN

TRADE



FREE 1-3 DAY SHIPPING
on most orders over \$49*
*details at adorama.com/shipping

42 W 18TH ST NYC
888.582.3900
adorama.com/pro

ADORAMA PRO

■ A Visit to the Set



Old friends R2-D2 and C-3PO (Anthony Daniels, right) stand in the Resistance base, ready for adventure.

effects, and notes with a smile that the rig is currently operating at only 20 percent of its full capability. He fears that going much higher in intensity would cause excessive motion sickness for the actors.

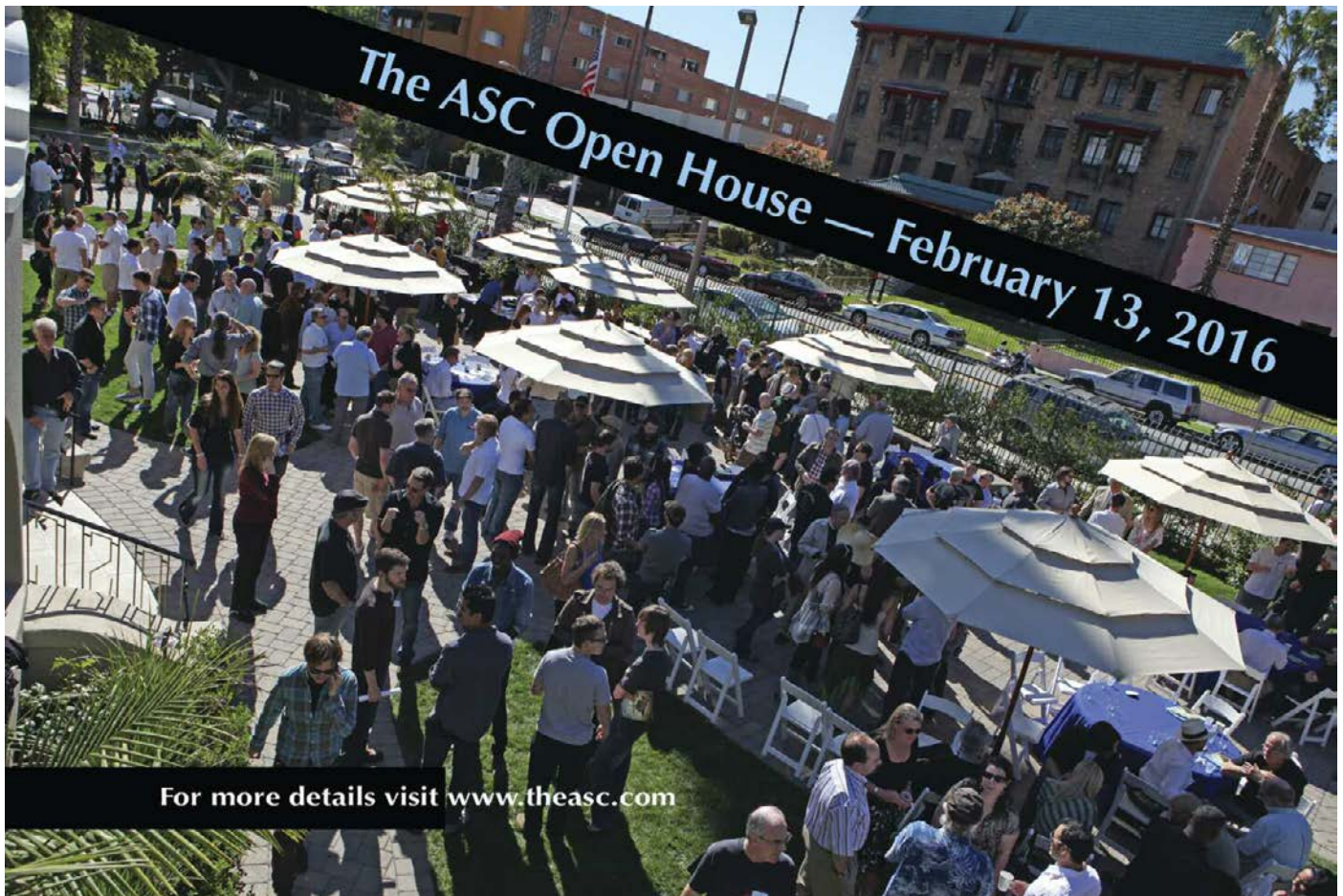
As the rig flails wildly, Grunberg runs through a litany of classic *Star Wars* cockpit lines, including “Approaching target” and “Watch out for ground fire!” Thanks to the gimbal’s intense movement and the interactive shadows of the day-exterior set, the image on the monitor, even with its bluescreen background, is highly convincing.

We head back to watch a bit more action at Starkiller Base, where we approach Mindel and veteran producer/Lucasfilm President Kathleen Kennedy to chat about the production’s overall approach. Both attest that everything that can be placed into the frame and shot for real is indeed being captured in-camera, in keeping with their commitment to the visual flavor of

the original *Star Wars* trilogy.

As we watch a few more takes involving a full-scale First Order snowspeeder, we realize we’re approaching the end of our visit. Stephen persuades legendary unit photographer David James to accompany us back to the *Millennium Falcon* cockpit and snap some stills of us with his Canon EOS-1D. Naturally, Stephen takes Solo’s seat and I settle into Chewbacca’s chair, noting that at my height of considerably less than 7’, I don’t even reach the foot pedals. Befitting Solo’s spartan tastes, the seats offer scant padding and might be a bit uncomfortable on those extra-long intergalactic hops.

James stands just behind the cockpit entrance, shooting over-the-shoulder shots of us as his assistants — sitting in the same chairs once occupied by Luke and Obi-Wan on their first voyage aboard the *Falcon* — provide handheld fill light with Rotolight Neo LED units. Davies assures us that we’ll



For more details visit www.theasc.com

receive these one-of-a-kind souvenirs once *The Force Awakens* is released, or maybe even prior. As you can see, she made good on the promise.

The crew has been clocking 10-hour days, and we're nearing the end of this one. We surrender our AVCO credentials to Gouldsbrough and linger in front of the Lucasfilm production offices as we await a car back to our hotel. As we stand on the lawn in the slowly setting sun, General Leia Organa herself — Carrie Fisher — suddenly appears and strolls toward us. She plucks a dandelion from the garden, blows it gently into Stephen's face and asks, "Was that annoying to you?" He laughs and tells her he's happy to indulge her whims, especially since she's the leader of the Resistance. After another minute or two of light banter, she smiles, bids us farewell and jumps into a waiting minivan.

Our trip to a galaxy far, far away is over for now. Stephen and I agree that



AC editor-in-chief and publisher Stephen Pizzello takes the helm in the *Falcon's* cockpit, with contributor Noah Kadner as his co-pilot.

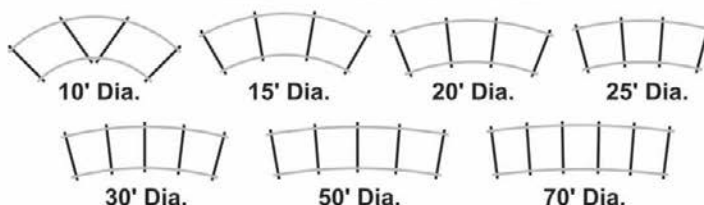
while December 2015 seems a long ways off, good things come to those who wait. ●

CAMERA DOLLIES, JIB ARMS & MORE



Accessory Carts for Model 10 & 11 Dollies

ROUND TUBE TRACK



NEW DOLLY ACCESSORIES

Scooter Board

- Fully Articulating Wheels
- Mitchell Mount
- 4 Tie downs
- 4 Speed rail receivers
- 4 Carrying handles
- 44 3/8" pre drilled holes for high hats and other accessories
- 3 Tripod foot locators
- 34 1/2" W x 53" L

Order Code: **SCOA**



Short Front Board

is a shorter version of the standard front board (F).

For Model 10 & 11 Dollies.

Order Code: **SFB**



Short Narrow Front Board

is narrower for tight quarters and doorways.

For Model 10 & 11 Dollies.

Order Code: **SNFB**

J.L.Fisher

Motion Picture & Television Equipment

"J.L. Fisher® products are proudly made in the U.S.A."

AVAILABLE FOR RENTAL WORLDWIDE

J.L. Fisher, Inc. 1000 W. Isabel Street, Burbank, CA 91506 U.S.A.

Tel: (818) 846-8366 Fax: (818) 846-8699

Web: www.jlfisher.com e-mail: info@jlfisher.com

J.L. Fisher, GmbH Emil-Hoffmann-Str. 55-59 50996 Köln, Germany

Tel: +49 2236 3922 0 Fax: +49 2236 3922 12

Web: www.jlfisher.de e-mail: info@jlfisher.de

A Space Opera's High Notes



Dan Mindel, ASC, BSC reteams with director J.J. Abrams to carry forward the Skywalker saga with *Star Wars: The Force Awakens*.

By Iain Marcks

•|•



Opposite: Before she heeds the call to adventure, Rey (Daisy Ridley) subsists as a scavenger on the desert planet Jakku. This page, top: Rey and former stormtrooper Finn (John Boyega) face off against Kylo Ren (Adam Driver). Middle: Cinematographer Dan Mindel, ASC, BSC measures the light on location in Abu Dhabi. Bottom: Director J.J. Abrams (gesturing) discusses a scene with Mindel and crew.

After spending much of the past decade behind the camera on a string of action and effects spectacles — including *John Carter* and *The Amazing Spider-Man 2* — it would be understandable if cinematographer Dan Mindel, ASC, BSC were starting to feel a bit pigeonholed. In truth, it doesn't seem to bother him much at all. "After *John Carter*, I decided to make myself an expert in effects films," he says.

That expertise was called upon once again when director J.J. Abrams signed on to helm *Star Wars: The Force Awakens*, the long-rumored and wildly anticipated seventh episode in the *Star Wars* saga. Mindel and Abrams had previously collaborated on *Mission: Impossible III* (AC May '06), *Star Trek* (AC June '09) and *Star Trek Into Darkness* (AC June '13), so it was perhaps not a surprise when the call came asking Mindel to join the director on his journey to the galaxy far, far away.

The timing of that call, though, was not ideal, as Mindel was still in the midst of production on *The Amazing Spider-Man 2* (AC June '14). "I said, 'I would love to, but I have to focus on the movie I'm on,'" the cinematographer



■ A Space Opera's High Notes

Top: Kylo Ren and First Order stormtroopers are on a mission to crush the Resistance. Middle: Mindel frequently used a 1K Blonde and colored gel to provide contour on masked characters such as Captain Phasma (Gwendoline Christie). Bottom: Stormtrooper FN-2187 experiences a crisis of conscience.



recalls. “If I started thinking about *Star Wars*, I would explode. I mean, how exciting would that be?”

By June of 2013, Mindel had wrapped *Spider-Man* and was officially in preproduction on *The Force Awakens*. At that point, Abrams was still developing the story at his production company, Santa Monica-based Bad Robot, in collaboration with screenwriter Lawrence Kasdan and production designer Rick Carter, among others. Meanwhile, Carter’s co-production designer, Darren Gilford, was at Pinewood Studios in the U.K., working alongside supervising art director Neil Lamont to gather the art department and begin constructing sets. Mindel and Abrams stayed connected with Pinewood in a series of videoconferences, which also included costume designer Michael Kaplan.

Taking place some 30 years after the events of *Star Wars: Episode VI – Return of the Jedi*, *The Force Awakens* finds the galaxy in turmoil once more, as the First Order has risen from the ashes of the Galactic Empire. To meet this new threat, princess-turned-general Leia Organa (Carrie Fisher) leads the Rebel Alliance-inspired Resistance into



Left: Rey bundles up her discoveries to sell in the scavenger marketplace. Below: A Panavision Millennium XL is mounted on a Libra head on a 30' Technocrane for a shot of Rey on her speeder.

action — with the help of friends both old and new.

Every decision made by Mindel and Abrams was informed by the look and feel of the original *Star Wars* trilogy, particularly *Episode IV – A New Hope*, shot by Gil Taylor, BSC and released in 1977. “I knew we were going to shoot for a [2.39:1] aspect ratio, and we were going to shoot anamorphic, on film,” says Mindel. “[*The Force Awakens*] is an amalgamation of everything that J.J., Rick and I really loved about those movies, and J.J. was very careful that we didn’t change the look.”

Panavision London was able to supply a handful of the type of C Series anamorphic primes Taylor had used to shoot *A New Hope*, but in tests they proved too soft and lacked the strong, high-contrast look that characterizes Mindel’s work with Abrams. Mindel began a dialogue with ASC associate Dan Sasaki, Panavision’s vice president of optical engineering and lens strategy, about building a set of primes that would emulate the tone of the older lenses, but provide sharper images with greater contrast. Mindel used the result-

ing “Retro C” primes for scenes that focus on the Resistance. Scenes with a focus on the First Order were filmed with Primo anamorphic primes.

Characters from either side inevitably share scenes, and in such instances, Mindel explains, “We would just choose whichever lens enabled us to tell that particular story beat in the best way. Generally, we would go with Retro Cs because they were just so beautiful-looking.” For scenes in which twisted Vader-worshipper Kylo Ren (Adam Driver) interrogates the film’s heroine, Rey (Daisy Ridley), and Resistance pilot Poe Dameron (Oscar Isaac), Kylo’s single was filmed with a Primo and the reverse shots were filmed with the Retro Cs.

Prior to the start of production, Mindel collaborated with 2nd-unit cinematographer Bruce McCleery to catalogue each Retro C prime in a series of tests that recorded the lens’ performance at every focal length and T-stop, with varying levels of diffusion. The main cast members’ stand-ins were filmed next to a color chart, textures supplied by the art department, and



various types of practical lights. All the data went into a digital file Mindel could reference during production. “The more we shot with them, the more we were able to understand how they worked,” says Mindel, who tried to keep his stop at

■ A Space Opera's High Notes

Right: Mindel and crew utilized large unbleached muslins and made the most of natural light for the site of this crashed TIE fighter and other scenes filmed in the Abu Dhabi desert. Below: A 30' Technocrane places the camera over Finn's shoulder as he gazes beyond a ridge on Jakku.



T2.8^{2/3} for the majority of the film. When necessary, a 1/8 or 1/4 Tiffen Black Pro-Mist was used. “The extra diffusion would be used when we wanted the highlights to bloom more than normal,” he explains.

Abrams made it clear early in preproduction that he wanted to employ analog techniques whenever possible on *The Force Awakens*. “In this way, shooting film was the only choice that we could make,” says Mindel, who shot with three Kodak Vision3 film stocks: 500T 5219, 250D 5207 and 50D 5203.

The production's primary cameras

were two Panavision Millennium XLs that were repainted matte-black; the A-camera was christened “Millennium Falcon” and the B-camera was dubbed “Death Star.” Additionally, McCleery used 15-perf 65mm Imax cameras — the MSM 9802 in the studio and the MKIII in Abu Dhabi — to film plates and establishing shots for visual-effects supervisor and second-unit director Roger Guyett. Due to the Imax camera's size and weight, aerial director of photography Adam Dale used an Arri Alexa to shoot the aerial plates in Iceland and Abu Dhabi. The sequence

in which Rey and Finn (John Boyega) are attacked by TIE fighters in the Jakku desert was the only instance when the 65mm format was used for 1st-unit photography. The Imax cameras were fitted with “Imax prime lenses, the new-generation Imax 80mm, and Panavision's rebuilt 80mm and 50mm,” McCleery notes.

Though the film contains a significant number of practical effects, there are still more than 2,000 digital-effects shots in *The Force Awakens*. “Computer graphics were used for set extensions, lightsabers, creatures and spacecraft, but it was also used to assist the practical-effects work done in-camera,” Mindel clarifies. “It was necessary for us to roto out puppeteers, [rather] than to try and hide them from the camera.

“Schedule and budget generally dictate what will be a digital or practical effect,” the cinematographer continues. “Once we knew what was going to be a digital sequence, Roger Guyett would come in with ideas about how to shoot it, and then we would work out where it crosses over from first to second unit.” The parameters of that crossover were fluid, Mindel notes, but in general, “we assume that it's a first-unit sequence until it's not.” (See sidebar, page 60.)

Two of the main characters in *The*

CHAPMAN/LEONARD
STUDIO EQUIPMENT, INC.



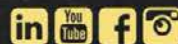
3-AXIS CL STABILIZED HEAD

CREATING MOMENTS THROUGH MOVEMENT

WWW.CHAPMAN-LEONARD.COM

HOLLYWOOD, CA - (888) 883-6559
LA, NM, TX, GA - (888) 758-4826
FLORIDA - (888) 337-8243
UK & EUROPE - (888) 337-8243

ASK ABOUT OUR ORLANDO, FL SOUND STAGES!



HYDRASCOPE TELESCOPING CRANE
available in 15' 20' 32' 43' & 73'



■ A Space Opera's High Notes

Top: Abrams directs Ridley as she stands atop the wreckage of an Imperial AT-AT walker. Middle: Rey and Finn run from TIE fighters. This sequence marked the only instance when the 1st unit shot with the 65mm format. Bottom: Mindel and crew prep a scene on location in England's Puzzlewood in the Forest of Dean, Gloucestershire.



Force Awakens are entirely digital creations: the Force-sensitive space pirate Maz Kanata (Lupita Nyong'o) and the Dark Side's Supreme Leader Snoke (Andy Serkis). Mindel filmed the motion-capture actors with their live-action co-stars on set. Face-mounted cameras worn by the motion-capture actors during takes recorded their expressions for Guyett and his team of artists to later incorporate into the digital models. "Once we got the flow, we did takes with the live actors, and the mo-cap actors [were] off-screen reading their lines," notes A-camera 1st AC Serge Nofield.

Otherwise, the strange characters and alien creatures that inhabit the film were built as practical puppets or portrayed by actors in masks or prosthetics. "Shiny masks and armored suits are fabulous to shoot because they respond to the light in interesting ways, and these days it's very easy to remove camera reflections," Mindel remarks. "For Kylo Ren and the other masked characters like Captain Phasma [Gwendoline Christie], we would bring in a 1K Blonde and a colored gel — sometimes a red, green or blue — just to get a bit of contour on their masks."

For the alien creatures, he notes, "there were no rules as to how they're supposed to look. It's just a matter of



6th CAMERIMAGE WINNERS SHOW LOS ANGELES, 19-21 FEB 2016

ORGANIZED BY:
CAMERIMAGE FILM FESTIVAL AND AMERICAN SOCIETY OF CINEMATOGRAPHERS

HOSTED BY:
AMERICAN FILM INSTITUTE CONSERVATORY - CINEMATOGRAPHY DISCIPLINE

Venue: Mark Goodson Screening Room at Louis B. Mayer Library building, AFI Campus
2021 N. Western Avenue, Los Angeles, CA 90027

SPONSORS AND PARTNERS:

Co-financed by
the Ministry of Culture
and National Heritage
of the Republic of Poland

Ministry of
Culture
and National
Heritage of
the Republic
of Poland



■ A Space Opera's High Notes



Top: General Leia Organa (Carrie Fisher) leads the Resistance. Bottom: The crew prepares to shoot inside the Resistance base.

giving them shape and weight, like they have presence.” Mindel nominates Chewbacca’s mask (worn by series veteran Peter Mayhew) as one of the more challenging prosthetics to photograph. “His eyes are set so deep into the mask that it was hard to get the light in there — plus there’s dark makeup around the edges of his eyes. Usually we had a 1K Baby or a 2K Junior just over the camera with a piece of Lee 129 [Heavy Frost diffusion] on it, barely enough to catch a reflection.”

Principal photography on *The Force Awakens* began in June 2014. The

desert surrounding Abu Dhabi was transformed into the desert planet of Jakku, a remote world with a scavenger community. “The planet is at the outer edge of space, and we wanted to give it that feel, but it’s also gorgeous in its remoteness and its roughness,” says Mindel.

“We first scouted the location the previous winter, but when the weather changes there it’s not a matter of dry and wet,” the cinematographer notes. “During the summer there’s a haze in the air, due to the ‘shamal’ winds coming from the northeast, which

makes the sky appear white. It looked beautiful during some parts of the day, but at midday it was pretty ugly. We weren’t in the position [where we could stop shooting], so we just had to deal with it.”

The site of Finn’s TIE-fighter crash and a starship graveyard were filmed south of Abu Dhabi, close to the Saudi Arabian border. Additionally, the Niima Outpost scavenger-market set was built from the ground up, about a 30-minute drive from Abu Dhabi, near the Persian Gulf coast.

Panalux London shipped a location lighting package to Abu Dhabi, “but unfortunately you can’t take cherry pickers into the desert, so we were fairly limited in the way we could control it,” says Mindel. “We tried not to light everything and just go *au natural*.”

“We used 12-by-12, 8-by-8 and 20-by-20 unbleached muslins, and Dan encouraged us to let them get a bit grubby so they would blend in with the desert,” says gaffer Perry Evans. “We also had the art department use brown tarps and gauze to create shade in the market set. Shooting earlier and later in the day helped keep the sun low and not so toppy.”

After three weeks of photography in Abu Dhabi, 1st-unit production moved to Pinewood, where McCleery’s 2nd unit had prelit sets on nine interior stages and both back lots. One of the



unleash

redefined revenue • immersive experiences • fresh programming

**APRIL
16-21
2016**

LAS VEGAS, NV USA

NABShow.com

#NABShow

► **register today**
Free Exhibits Pass Code PA08

The media and entertainment industry has become unleashed. Dynamic innovation and cutting-edge technologies are shattering the boundaries of storytelling and opening up limitless opportunities to entertain and engage audiences.

Embrace the immersive experiences reshaping the new reality of media. Further your knowledge of connected technologies fueling anytime-anywhere consumption and collaboration, from live and local to archived and global. Explore production innovations evolving at warp speed to expand content delivery to emerging channels and integrated platforms.

NAB Show® is the only place to break free from conventional thinking and open your mind to new partnerships, new technology, new tools and fresh perspectives. The sky's the limit, and the only thing you have to ask yourself is: how far will I go?

THIS CHANGES EVERYTHING.

NABSHOW®
Where Content Comes to Life



1 Open or download your QR scanner app. 2 Scan the code — unleash the experience.

•• A Unique Second Unit ••

Aiding Dan Mindel, ASC, BSC in the shooting of *The Force Awakens* was his 2nd-unit cinematographer and longtime collaborator Bruce McCleery. The 2nd-unit team, which includes visual-effects supervisor and 2nd-unit director Roger Guyett, has worked together on nearly all of director J.J. Abrams' films, including *Mission: Impossible III*, *Star Trek* and *Star Trek Into Darkness*.

"The way that second unit is structured on J.J.'s films is different than typical second units," offers McCleery. "We're a fortunate team of filmmakers that has been together on a lot of projects, which brings about a level of comfort, intimacy and trust that isn't necessarily the norm."

That trust, McCleery continues, "allows J.J. to schedule the movie [so] that he can go back and forth between the units. We'll frequently work on sequences that the first unit is working on, taking care of the action beats and the more complicated and time-consuming aspects of the sequence, as a traditional second-unit team would, but sometimes we're handling entire sequences just with second unit."

"Mostly, whenever you see someone flying in an X-wing or TIE fighter, when a set is on a gimbal, or there are a lot of big battles or explosions and fight sequences, or when characters are on wires, we'll handle the brunt of that," he adds. "Many of the ship interiors — with the exception of the *Millennium Falcon* — we handle those. We often dealt with really elaborate visual-effects components with CG elements. Because Roger is a very savvy visual-effects supervisor as well as an accomplished director, he knew intimately what the background environment was that we were inserting some element into, and that was invaluable."

McCleery started prep on *The Force Awakens* in early March 2014 and jumped right into discussions with Mindel. "During that prep I had a lot of time to test," he recalls. "I would shoot tests for Dan, which is part of our fairly unique relationship. I've known Dan for more than 20 years and we have a very comfortable sort of language and communication. We do multiple rounds of testing, and I try



to light each set several different ways, working in cooperation with the art department and wardrobe to try out textures and colors and set dressings and such. The art and construction departments were really fantastic. They worked incredibly hard to have several huge sets ready for these tests way ahead of time. We'd try different atmospheric conditions; various lenses, gels, camera moves and filtrations; we'd test highlights and exposure bracketing; and then Dan and I would watch these tests together in the theater at Pinewood to figure out how to approach each set. It sounds like a luxury, but it really saves time on set. Later, when we went back to shooting that set for the film, I'd know that Dan went with 'Option C' from our tests and know exactly how to approach my lighting."

Though occasionally the scenario was transposed, 1st unit would generally start shooting on a particular set and 2nd unit would come in later to finish it off. And although the 1st-unit crew would move on, the lighting-board operators would remain with the set, as they had the detailed knowledge of 1st unit's cues and decisions. The system relied upon the close cooperation of the 1st- and 2nd-unit lighting departments, led respectively by Perry Evans and David Sinfeld.

In the course of the adventure, Poe (Oscar Isaac) and Finn (John Boyega) steal a TIE fighter to make a getaway, and

although the production had created a full-scale TIE-fighter cockpit, the coverage demands for one particular shot were too much for the small space. "It was really hard to get in there with the camera, and J.J. wanted to do part of the scene [as] a 360-degree shot around the characters," recalls McCleery. "Within the set, it was impossible — there was no way we could do that, so we had to rebuild the set in CG. We ended up rebuilding the fighter out of bluescreen [material] in different layers and in exactly the right proportions to create the physical restrictions of the cockpit, and to make sure we didn't violate that physical space with the camera, which was rapidly circling the actors via Steadicam."

"The way I lit the scene came mostly from the portals — with interactive light from outside motivated by the raging battle — as well as from the set itself," he continues. "To maintain consistency, we re-created the portals with bluescreen orifices and lighting gobos that had bluescreen behind them, so that when you looked out the portal you saw blue. When we weren't looking at the portals, I could light through the orifice and then have electricians move the lights — which were handheld, on cranes and [on tracks] — out of the way when the camera came around to see the portal. The characters are flying around in the middle of a battle, so there are moving and changing lights

■ A Space Opera's High Notes

from other ships, their guns firing and enemy guns firing — and all of that interactive light plays on them — as well as fire and smoke and explosions. I had lights on cranes moving around, but mostly the bluescreen ship elements were to make sure that we never violated the physical constraints of the cockpit with the camera; we always maintained the integrity of that space.”

On the subject of bluescreen versus greenscreen, McCleery asserts, “I really let Roger dictate that, but generally when you’re working in a low-light environment, where the screen has to be close to the actors, there’s less contamination from blue than there is from green, and it’s easier to key off blue at lower light levels.”

Other sequences that McCleery and his team handled included Rey (Daisy Ridley) scavenging from a wrecked Star Destroyer at the top of the film, as well as a flashback sequence — lovingly dubbed a “Force-back” — where Rey’s Force powers allow her to see different times and places.

“The Force is taking hold of her and she’s connecting with it, and as she does that she goes into different environments — places she’s never been,” explains McCleery. “We did a lot of that, because much of it is entirely virtual space.”

“Second unit is a challenging and fun world to work in,” he concludes. “You have to step into the mind of the main-unit cinematographer and director. You have to combine a certain level of intuitive detective work, to ascertain what they wanted, with knowing where the point of departure exists — where you’re allowed to input your own creativity and stamp. You have to understand the reasons why they made decisions and expand on those decisions. It’s a hard concept to articulate, but it’s the important aspect that makes the job challenging and worthwhile. It’s a true team effort and I am very lucky to get to work with inspired colleagues who entrust so much to me.”

— Jay Holben

back-lot sets was for a Jakku night exterior in which Kylo Ren’s shuttle and First Order transporter ships descend upon a desert village, where stormtroopers proceed to burn buildings and massacre inhabitants. Mindel had wanted to film the scene in Abu Dhabi, but couldn’t due to the scale of the action.

Instead, Mindel explains, “We made our own dunes on this multi-acre set, built into an indent of ridges, and relied on the fact that the village was going to get torched, so a lot of the lighting is just firelight.” A Wendy light was positioned in each corner of the set as an ambient moonlight for whatever direction the camera was facing, while the special-effects department provided flame bars for firelight effects. Clay Paky Sharpy moving fixtures provided the oscillating searchlights of the First Order ships.

Exterior plates for the First Order’s Starkiller Base — a Death Star-inspired mega-weapon carved into the heart of a far-flung snow planet — were filmed by McCleery in Iceland. Fake snow was shoveled onto the Pinewood back lots for certain snow-planet exteriors, but the lightsaber showdown between Kylo Ren, Finn and Rey that takes place in a dark forest on the planet’s surface was actually filmed on Pinewood’s Q Stage, “probably the biggest stage I’ve ever worked on,” says Mindel. “We took real trees [felled in] a hurricane and installed them on a contoured floor, then we hung a rail of bluescreen, a rail of black, and a painted forest backing all the way around the set so we could shoot in any direction.”

Digital replacement was necessary when the camera saw up into the lighting grid, where Mindel and Evans had hung 5K space lights for a soft nighttime ambience. Thousand-watt Par cans, clustered in banks of 12, cast pools of light onto the forest floor, and 20Ks diffused with Lee 129 could be lowered as a soft overhead source. All tungsten sources were cooled with 1/2 CTB.

“The idea was that you would

never have enough light or depth of field to see what was happening through the space between the trees, and that was the beauty of doing it in-camera,” Mindel remarks. “We actually got away with not using the blue- and green-screen backdrops very often.”

Lightsaber props, though later embellished with computer graphics, utilized RGB LED strips and were robust enough to employ in stunt fights. Their color, intensity and effects — such as the bright flash of two sabers striking one another — could be remotely controlled by dimmer operators Will Burns with the 1st unit and Eliot Coulter with the 2nd.

“We tried to provide enough ambient light that you could see the action, and every time the lightsabers moved around they would throw enough light to make it a bit more interesting to look at,” Mindel offers. “The film stock allowed us to see a couple of stops over and under, and as long as there was a sheen on John’s skin, you’d see the sabers working.”

Interiors for Starkiller Base and the First Order’s Star Destroyer capital ships are slick, black and metallic, an homage to the Empire of old. Corridor and room sets were modular in design, allowing them to be reconfigured without necessitating new construction. Working closely with Gilford and the art department, Mindel incorporated practical lighting inspired by that used for Imperial interiors in the original trilogy; dubbed “pills,” these are oblong fluorescent sources built into the set to give off a soft white light. Close-ups were lit with 2K Blondes and Lee 129.

By contrast, the ships and environs of the Resistance have the lived-in, used-universe look that *A New Hope* popularized. The settings are functional and at times grubby, and the Resistance is further delineated by a predominantly earth-tone color palette, as opposed to the First Order’s black-and-white aesthetic.

A particularly “awe-inspiring” set, Mindel notes, was “the full-sized *Millennium Falcon*.” For the ship’s inte-

■ A Space Opera's High Notes

Right: Mindel studies the scene as Philippe Carr-Forster frames a low-angle shot of Kylo Ren inside the First Order's Starkiller Base. Below: Resistance pilot Poe Dameron (Oscar Isaac) leads a squad of X-wing fighters against the First Order. X-wing cockpit shots such as this were captured on a gimbal rig and shot by the 2nd unit.



riors, he explains, “we had to light it the way it was originally lit, and we had a lot of information from the art department, and old editions of *American Cinematographer*, as to how it was done. We tried to rely only on light that came from practical sources, like fluorescents in the floor and the ceiling. J.J. likes to use the whole set, so we prefer to light practically to give him the space to move the camera and actors.”

Contrasting with their work on *Star Trek* and *Star Trek Into Darkness*, as Mindel notes, a more conservative

approach was sought by the cinematographer and Abrams for sets that were visually tied to the history of *Star Wars*. “There were going to be no camera flares unless they happened naturally, and the swooping Technocrane shots were kept to a minimum,” Mindel elaborates. However, he adds, “the A-camera is never still unless the script calls for it.”

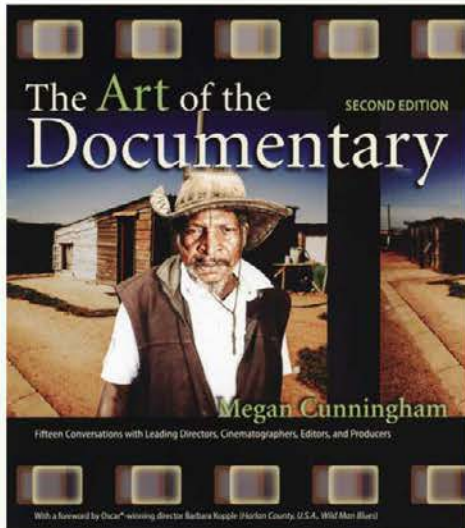
Decisions regarding camera movement and framing stemmed from a four-way conversation between Abrams, Mindel, A-camera and

Steadicam operator Colin Anderson, and B-camera operator Philippe Carr-Forster. While no hard-and-fast rules dictated how lenses should be used, Mindel says he favored the 40, 60 and 75mm anamorphic focal lengths for covering ensemble shots, close-ups and wide singles.

The *Millennium Falcon* cockpit set was mounted to a gimbal and could be used outdoors in natural light, or on a stage where it was lit by a 12'x12' incandescent light box diffused with Hampshire Frost. Another light box — fitted with 16 German Light Products Impression 90 LED moving fixtures that were set to various wash levels — was used to create a “hyperspace” effect, while a 6K Par on a camera crane and an 18K HMI reflected into a rotating mirror helped to convey a dynamic sense of movement.

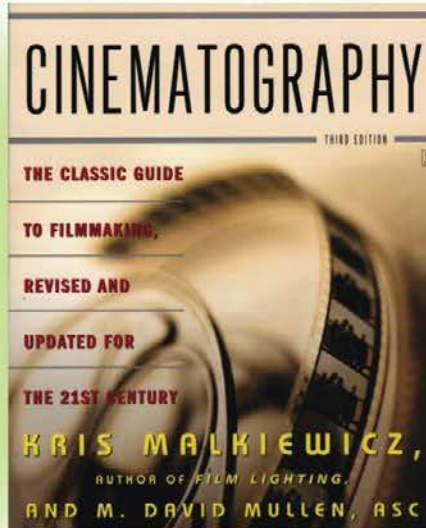
The other large-scale set constructed at Pinewood was the massive stone facade of Maz's castle. Exteriors around the castle were filmed on location in the green, scrubby woods around Pinewood and in Puzzlewood in the Forest of Dean, Gloucestershire. Resistance base exteriors were shot at

THE ASC STORE



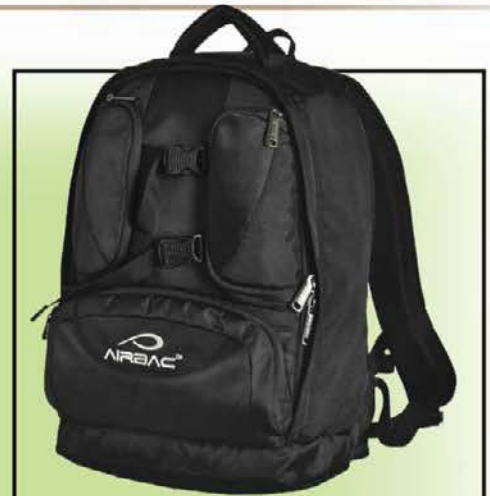
The Art of the Documentary Second Edition

Documentary filmmaking is a powerful and vital element to our society. Here, filmmakers who have brought real stories and issues to a creative medium discuss how they make a deep connection between us and their art.



Cinematography Third Edition

Based on their combined 50 years in the film and television industry, authors Kris Malkiewicz and M. David Mullen, ASC lay a clear and concise foundation for basic film techniques, focusing squarely on the cinematographer's craft.



AirBac Technologies Zoom Bag (Black)

Feels like you're carrying half the weight — our AIRBAC™ patented air support system allows the weight in the backpack to rest comfortably just above the waistline, to literally take the weight off your back and shoulders. You'll feel the difference immediately!



Storaro: Writing with Light, Colors, and the Elements

This new book combines elements of Vittorio Storaro, ASC, AIC's recently published trilogy and features double-exposure images from the exhibition "Storaro: Writing with Light." Also included is a DVD of *In Omaggio*, an hour-long documentary in which Storaro explains his philosophy about cinematography and how he draws inspiration from poets, writers, painters and other artists.

Storaro-Covili: The Sign of a Destiny

This book delves into the great figurative and psychological values that unite Storaro and painter Gino Covili.

For more information and to order, visit us at:

www.theasc.com

▶ A Space Opera's High Notes



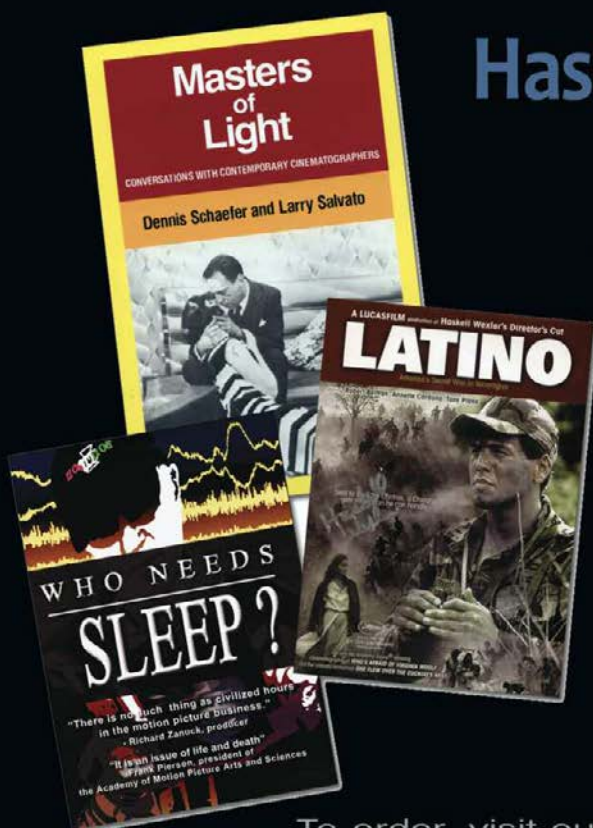
The crew captures a scene that features the First Order's General Hux (Domhnall Gleeson) aboard the Star Destroyer Finalizer.

the Royal Air Force Greenham Common station. "Almost everything there was practical," notes Mindel. "We had the *Falcon*, just the on-camera side; X-wings; and some other vehicles. The

[visual-effects] set extension was for the background, just to take out any modern, earthly features." Interior sets for Maz's castle and the Resistance base were filmed on stages at Pinewood.

After principal photography wrapped in the U.K., production downsized for its move to the final filming location: Skellig Michael, the island home of an isolated eighth-century Christian monastery off the southwestern coast of Ireland. In *The Force Awakens*, it's the location of the last living Jedi Master. Film equipment was brought onto the island by boat and carried by hand 600' up an ancient, winding staircase to the monastery's stone cell huts. "It was J.J., myself, Colin, Serge, sound, key grip Gary Hymns and Perry," says Mindel. "We took a camera, a 6-foot slider, a flatbed dolly and track, a Steadicam, 1.2K and 575-watt HMIs, and 1K Blondes. We spent four days there with a minimal crew. It was a fabulous way to end, really."

The production's 35mm and 65mm negative was processed at FotoKem in Los Angeles; the geographical distance required what Mindel recalls as a "nerve-racking" two-



Haskell Wexler 3-Pack

This package gives you two remarkable features directed by Haskell Wexler, ASC, and a copy of Dennis Schaefer and Larry Salvato's book *Masters of Light: Conversations with Contemporary Cinematographers*, which features interviews with Wexler and 14 other directors of photography.



To order, visit our website: www.theasc.com

day turnaround for dailies. Company 3 London, along with sister company EFilm in Hollywood, produced 2K scans of the 35mm film, and FotoKem generated the 65mm-footage scans. Company 3 London colored and delivered digital dailies to the editorial offices at Pinewood. Toward the end of the production, 35mm processing moved to London-based lab iDailies to facilitate an overnight turnaround.

"We designed a workflow where iDailies processed and then sent the neg to Company 3 London, who would then stream the 2K session to Pinewood Theater 7 in real time," says Mindel. "I like to look at dailies in the morning first thing with the camera guys, so we know where we stand and where we're going to move to that day."

Deliverables for *The Force Awakens* included a 2D and 3D 2K DCP, a 2D and 3D Imax DCP, 35mm archival prints, and a small number of 70mm exhibition prints. Stereo D

handled the stereoscopic conversion. The final color grade was performed at Company 3 in Los Angeles, where colorist Stefan Sonnenfeld, an ASC associate member, worked with 4K scans from FotoKem (65mm) and EFilm (35mm). "This project isn't as super-stylized as some of the projects Dan and I have done together," says Sonnenfeld. "If there were inconsistencies with weather or visual-effects shots, we'd smooth it out, but we weren't trying to create a new look. It was more about reinforcing Dan's work and enhancing the filmmakers' intentions."

Mindel considers his experience on *The Force Awakens* to have been "an honor and a privilege." Still, he adds, "It's going to be a huge relief to let it go and move on, because the responsibility was enormous. But to have worked with all my friends and J.J. again was more than a gift." ●

◀ TECHNICAL SPECS ▶

2.39:1

Anamorphic 35mm,
15-perf 65mm, Digital Capture

Panaflex Millennium XL;
Imax MSM 9802, MKIII;
Arri Alexa

Panavision Primo, Retro C; Imax

Kodak Vision3 500T 5219,
250D 5207, 50D 5203

Digital Intermediate

Think Bigger

Celeb 401Q

Celeb 201

Celeb 401

celeb®
Wireless DMX

Kino Flo® is going big. Our Celeb® LED fixtures light close ups and large production sets with the same cinematic texture, color subtleties and contrast you've come to expect from large, soft Kino Flo's.

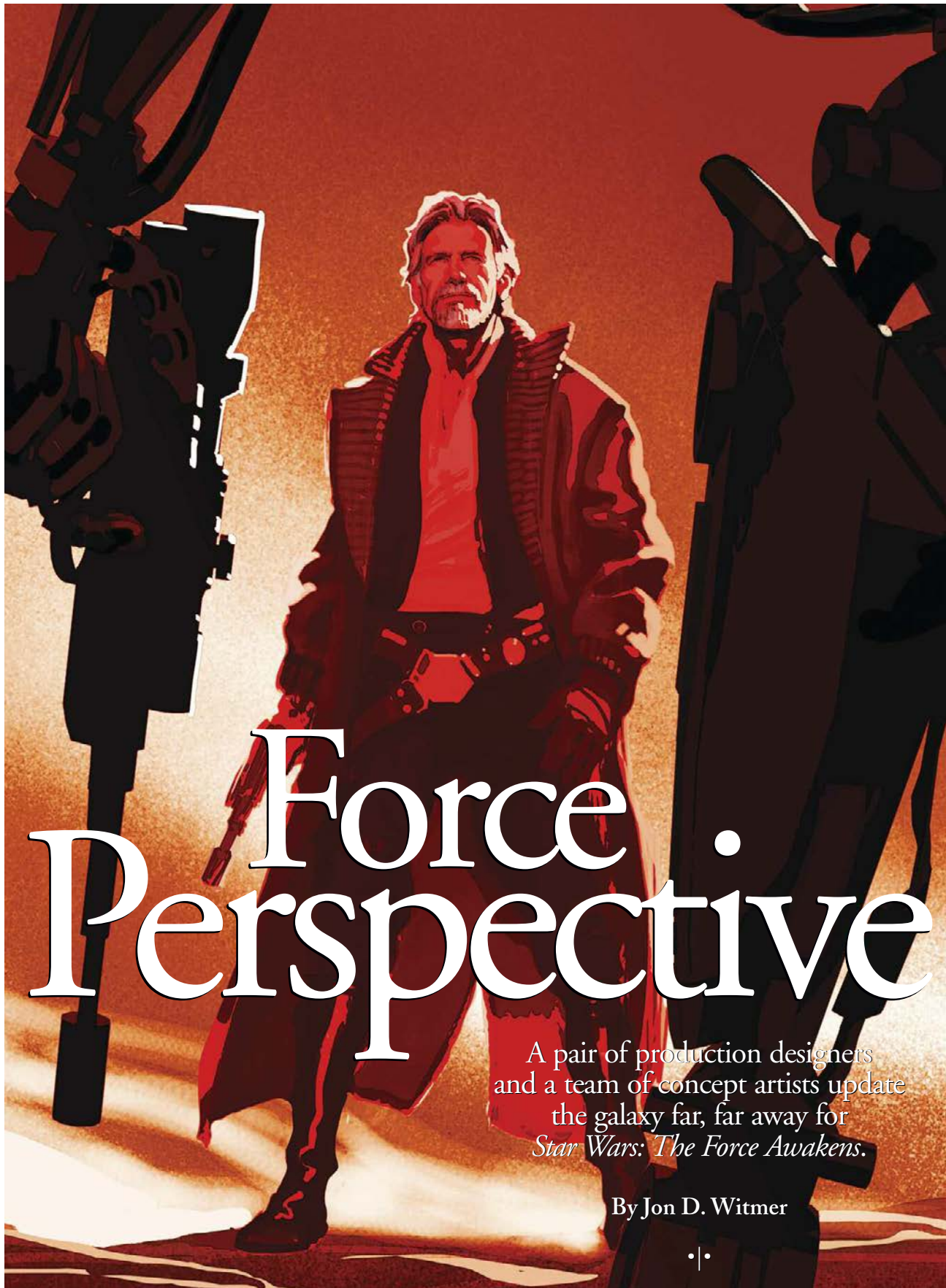
New Wireless DMX and variable color from 2700 to 6500 Kelvin promise enhanced control over your image. Cool without metal fins or noisy fans, Celeb LED's are stable for 50,000 hours.

www.kinoflo.com



KINO FLO
Lighting Systems

2840 North Hollywood Way, Burbank, CA USA voice +1 818 767 6528



Force . Perspective

A pair of production designers
and a team of concept artists update
the galaxy far, far away for
Star Wars: The Force Awakens.

By Jon D. Witmer





“How strong is the Force?” That was the question production designer Rick Carter first posed to a team of concept artists in order to spark their imaginations as they set to work on what would ultimately become *Star Wars: The Force Awakens*. “We called ourselves ‘the visualists,’” Carter says. And he explains that with his question, he was asking, “What is the Force? Where does it stand now? Where can this saga take us?”

Among the visualists were Doug Chiang and Christian Alzmann. Chiang had served as design director on *Star Wars: Episode I – The Phantom Menace* (AC Sept. '99) and concept-design supervisor on *Episode II – Attack of the Clones* (AC Sept. '02) before joining Carter as co-production designer for *The Polar Express* (AC Nov. '04). Alzmann is a veteran concept artist and visual-effects art director at Industrial Light & Magic, with credits that include *Indiana Jones and the Kingdom of the Crystal Skull* and *The Hunger Games*. Carter would also tap Darren Gilford — who had already helped visualize the sequel to another decades-old franchise with *Tron: Legacy* (AC Jan. '11) — to work as his co-production designer.

Last April, Carter, Gilford, Chiang and Alzmann appeared together for a panel discussion at the *Star Wars*



Opposite: Concept artists Christian Alzmann and Iain McCaig collaborated on this design — created in February 2013 — for Han Solo. This page, top: In January 2013, concept artist Doug Chiang created this painting of Kylo Ren in a snow-blanketed forest. Middle: Co-production designer Rick Carter stands on the forest set, which was built onstage at Pinewood Studios. Bottom: Co-production designer Darren Gilford poses with the full-scale build of the *Millennium Falcon* on location at RAF Greenham Common.



Force Perspective



Top: From November 2013, artist Glyn Dillon's concept piece shows stormtroopers in various uniform configurations. Bottom left: Luke Fisher's concept piece, from November 2013, for the "castle droid" seen outside of Maz Kanata's castle. Bottom right: Fisher's design from June 2014 for what would become Captain Ithano, one of the patrons at Maz's castle.

Celebration fan event in Anaheim, Calif., offering attendees one of the first behind-the-scenes glimpses of *The Force Awakens*. In the weeks leading to the film's release, each of these four artists spoke with *AC* in separate interviews, detailing their experiences designing the seventh episode of the *Star Wars* saga.

The wheels were set in motion to bring this team together when, circa October 2012, Chiang heard of Disney's acquisition of Lucasfilm and Kathleen Kennedy's promotion to

Lucasfilm president. (See sidebar, page 70.) Knowing that Carter was a friend of Kennedy's — the two had worked together on a number of features, including *Jurassic Park* (*AC* June '93) and *Lincoln*, the latter of which earned Carter his second Oscar after James Cameron's *Avatar* (*AC* Jan. '10) — Chiang called Carter to see if he knew anything more.

In turn, Carter remembers, "I called up Kathy Kennedy and said that I would like to be a part of the dialogue, if

she wanted me. So she had me come up [to Lucasfilm in San Francisco] in December, and I met with George Lucas, and we talked about the direction he saw [the story] heading. He wasn't going to be involved; he was just wishing us well."

Carter quickly invited Chiang to join him on the journey, and together they gathered a team of artists that included Alzmann; prequel veterans Ryan Church, Erik Tiemens and Iain McCaig; visual-effects art directors



Yanick Dusseault and James Clyne; and art director Kevin Jenkins. “I really wanted to come back and just be a regular designer,” says Chiang. “For the past 10 years, I was working as a production designer for Robert Zemeckis. So this was actually the first time in years that I was going to do artwork myself. And that was terrifying — I was so rusty, and the talent level had risen to such a degree that it was hard for me to keep up!”

The artists worked with such 3D modeling and rendering packages as Pixologic’s ZBrush, Autodesk’s Maya and the Foundry’s Modo, while 2D painting was typically done in either Adobe’s Photoshop or Corel’s Painter. “If I do character designs, it’s easier for me to do them in 2D,” Chiang notes. “When I design a set or a vehicle, I know Modo enough that I can block out shapes and forms to use as an underlay — my perspective line drawing, essentially — and then I paint on top of that with 2D.”

In keeping with *Star Wars* tradition, the visualists began working well before there was anything resembling a script — and, indeed, even before J.J. Abrams had signed on to direct. Once Abrams did enter the picture, he immediately invited Carter to join him as he developed the story with screenwriters Michael Arndt and, later, Lawrence Kasdan.

Carter refers to that process as “a six-month exploration” in which he worked alongside Abrams and the writers at the director’s Santa Monica-based



Top: Created by Alzmann, McCaig and Kurt Kaufman in May 2013, this early exploration of a starship graveyard placed the setting on a water planet. Middle: The graveyard was eventually moved to the desert planet Jakku, as depicted in this painting by Chiang from June 2013. Bottom: Andrée Wallin’s painting of the *Millennium Falcon* on Jakku from January 2014.

production company, Bad Robot, while the visualists continued their work in San Francisco. “We would have brainstorming sessions, and then [the concept artists] would visualize what we came up with,” Carter explains. “We

would lay out what I call a ‘moviescape,’ which grew and kept evolving, all the way around this big room that we were in, so people could refer to not just the note cards with story and character points, but to what it looked like. That

•| A Presidential Briefing •|

Kathleen Kennedy, producer on *Star Wars: The Force Awakens*, spoke with *AC* from London about her experience on the production and her time at Lucasfilm since assuming her role as company president.

American Cinematographer: How did your initial conversations with George Lucas inform the way you're now guiding the *Star Wars* universe, and Lucasfilm as a whole?

Kathleen Kennedy: I've known George a long time and I've worked with him, so it's not as though we were sitting down and having a conversation for the first time. Everything George has done with *Star Wars*, right from the beginning, has been very personal, and I could clearly see that what was really important to him — and certainly important to me — was story. It really required getting inside his head and talking a lot about it. And we are very fortunate to have a lot of incredibly great people still within the company that have spent a lot of years working with George, and have had these kinds of conversations over the years. They greatly respect the stories and respect the franchise, and they're still extremely involved in the decisions that we make creatively. That's probably the best way to describe how we began — it was over a period of time and conversations, to understand how he created all of this. [These conversations] very much provided the foundation for where we are right now.

We used that as a stepping-stone to move into what would become new — with new characters, new stories and new ideas. And the art department is very important alongside that, because our concept artists that work inside Lucasfilm work very closely with the Story Group, which is headed up by Kiri Hart, our director of development.

When it was proposed to shoot *The Force Awakens* on film, was there any pressure to shoot digitally instead?

Kennedy: No — I think the great thing was that we never got any pressure. Disney was always incredibly supportive



of whatever format we chose, and shooting on film was something that we decided right up front. It's something J.J. wanted to do, it's something Dan Mindel [ASC, BSC] wanted to do, and we're actually doing the same thing, almost identically, on *VIII*. I don't know if we'll still be doing that or not by the time we get to *IX*, but that is the plan. On *Rogue One* [the first of the upcoming *Star Wars* Anthology films], we're shooting digitally. We're [using] Alexa 65 [cameras] with Panavision lenses — so we're doing some interesting things that Greig Fraser [ASC, ACS] is working with. In fact, we're using [Ultra Panavision 70 lenses]. It's the only lens package in the world like this right now.

***Star Wars* has traditionally pushed the motion-picture medium to new heights. Would you say that is the case with *The Force Awakens*, and can you provide any examples?**

Kennedy: Certainly things that [Industrial Light & Magic] is doing from a technical standpoint — they're the kinds of things that won't necessarily be obvious to somebody unless you really know a lot about effects, but they are fairly significant breakthroughs. [There are] some real changes in terms of their simulation pipeline, so I think the imagery in the film is going to have an integration that you haven't quite seen

before. Some of the [character] motion-capture is quite spectacular. I would go so far as to say I think it's [some] of the best I've ever seen. And they've also been working with some new rendering software for making things look more photo-real.

One of the things that was so important to J.J. was how real everything felt. [We looked at] the actual plans of the *Millennium Falcon*, at exactly how it was built, and there were certain things we had to take inspiration from and then do differently — but anyone who knew the *Millennium Falcon* would not question that when Han Solo walks back inside that ship, you are, in fact, in the *Millennium Falcon*. And when Harrison [Ford] walked into it, he looked around and the first thing he said was, 'Oh my God, it looks better than I remembered.' That was an interesting, constant conversation with everybody in the art department, and also in the way that everything would be photographed and lit. [Employing] all of that new technology, and yet finding that familiarity and authenticity again, ended up to be more challenging than we thought.

Is the visual-effects work still in process?

Kennedy: Oh, yeah. We'll tweak until we can't tweak anymore. [Laughs.]

How many days of principal

Force Perspective

photography did you have on *The Force Awakens*?

Kennedy: We were 103.

***Star Wars* is the mythology of our time, not unlike the Greek myths of old. Do you feel a certain weight of responsibility in being charged with expanding a canon that's so fundamental to the cultural consciousness?**

Kennedy: I feel a huge responsibility to that. I absolutely think about it all the time. In fact, looking at *The Lord of the Rings* and *Star Wars* — [J.R.R.] Tolkien and George Lucas — that kind of defines modern mythology for our generation. What George has created, as he often talked about and we all continue to talk about internally, is a meaningful mythology, [which has now become] a history to draw from.

I also have often said that there's a fragility to it, too. Everything we do, we have to take seriously and put a great deal of effort into what it is we're creating. You sort of feel, as you talk about it, that Yoda is sitting on your shoulder. It is funny how you end up saying things and then think, 'That kind of sounds like the Force.' [Laughs.] It continually reminds you that what George was creating was something that does have meaning. It comes back in different ways, in the way people establish their values and their idea of how to lead a good life. They're inherent in *Star Wars*. And that is, I think, what we sit around and remind ourselves of. That yes, we're exploring drama and telling a story about good and evil, and yes, it takes place in outer space, but it's grounded in human values and compassion and generosity, and those are the ideas that were so important to George — and to make sure that they resonate in the storytelling. And I think that has a lot to do with why it's lasted.

— Andrew Fish

For an extended version of this interview, visit www.theasc.com in February.

way, the story was being created with a visual component, and by the time we got into the production design, we were already right up with the essence of the story that wanted to be told."

Abrams' ambition, Chiang recalls, was "to make a movie that was very true to *IV*, *V* and *VI*, meaning he wanted to design sets, vehicles, costumes and creatures that felt like they could have been something that George had shot." In order to connect with that original-trilogy style, the artists paid particular attention to the concept designs that Ralph McQuarrie, Joe Johnston, Nilo Rodis-Jamero and others had created for those films, as well as to the production-design work of John Barry for *A New Hope* and Norman Reynolds for *The Empire Strikes Back* and *Return of the Jedi*. "We were just trying to absorb some of that magic," Alzmann recalls.

"The design philosophy was, 'What does 30 years [after *Return of the Jedi*] look like?'" Alzmann continues. "We were extrapolating 1983 to 2015 [and asking] 'What would Ralph McQuarrie do in 2015?' What did design look like then, and what does it look like now?"

McQuarrie's artwork led directly to the updated X-wing fighters flown by the Resistance — *The Force Awakens'* outgrowth of the former Rebel Alliance — as it battles the First Order, the inheritor of the Galactic Empire's dark legacy. "The X-wing that Joe Johnston ultimately designed [for *Episode IV*] felt very utilitarian, hard edged, something that you would manufacture for war," Chiang explains. "Ralph did an earlier interpretation where it was a little more stylized, a little more romantic; it's almost automotive in some ways, like an F1 car. J.J. really liked that, and that's where the final version ended up."

From the beginning of his involvement in *Episode VII*, Carter had been laying the groundwork to bring on a co-production designer. He explains, "At this stage of things, I'm not really so into all the details. Not to say I'm not involved, but for me it's much less about

the tangible or technical side than it is about making a movie that wants to feel a certain way.

"I was looking for someone who would complement me, so that I could be, well, more like Obi-Wan Kenobi." Carter laughs, then adds, "I'll slice off some guy's arm in a bar, but I don't want to fight all the fights!"

"Rick is the wise master," Alzmann confirms. "He's talking about story moments: 'How do we bring soul to this?' And then Darren is the nuts and bolts: 'How are we going to build that?' They worked together really well because of that [dynamic]."

The arrangement also allowed Carter to remain stateside while Gilford went to Pinewood Studios outside of London, England, where he worked with supervising art director Neil Lamont to assemble the art department. "From the beginning," Gilford explains, "Rick was going to be with J.J., tied into the story development, and I was going to be in the field, on the ground, getting the logistics and the practical design going. And as we really started to get into production, it was a very 50-50 relationship. It was an amazing experience to have a partner going through this process."

Gilford was particularly keen to incorporate the use of physical models. "I think of *Star Wars* and I think of the miniatures," he says. "I look at Joe Johnston's drawings from the original movie, but then I look at the model makers who interpreted those drawings and the techniques they used. We call it a 'greeblie,' where a lot of the texture and the intricacy of the designs came from how the model makers would collage model-kit parts together. That was really important, so I had a couple of [concept] model makers, including Neil Ellis, working very closely with us."

"Once you translate a design into the physical world, it takes it to another level," Chiang adds. "I still find it incredibly valuable to do foam-core models and practical maquettes. It's part of the discovery process. Even when we design virtual sets, it still helps to have a

Force Perspective



Top, from left: Storyboard artist Kurt van der Basch, Carter, director J.J. Abrams, Gilford, visual-effects supervisor Roger Guyett and executive producer Tommy Harper survey a model of Maz's castle exterior, which would be built on the back lot at Pinewood. Middle: Models and maquettes were an important part of the design process. Bottom: Abrams reviews creature designs with creature-shop supervisor Neal Scanlan (left) and creature concept designer Jake Lunt.

physical card model, because it's so much easier to communicate what the set is. The more you can do that, the better the film will look, because it will ground [the designs] in reality."

As the conceptual development continued, designs were constantly revisited. "You design something when it's just words on paper," Alzmann muses. "Then you hire an actor or you build a set, and suddenly that design isn't quite vibing in juxtaposition with the new thing. J.J. would feel it, and then we would do another round of design. There was a lot of caution on this project, where we would go back to the drawing board — if nothing else, just to make sure we were happy with the original design."

"J.J. and I would discuss what made things quintessentially *Star Wars*," Gilford notes, "and we'd think about how iconic a lot of the shapes were. You think of the X-wing fighter, you see the 'X.' The TIE fighter has that really distinct 'H' shape. The *Millennium Falcon* is a disc with mandibles. These aren't overly complicated silhouettes."

In designing the personal shuttle of villain Kylo Ren (Adam Driver), the artists were particularly inspired by the Imperial shuttles seen in *Return of the Jedi*, including the stolen shuttle *Tydirium* that the Rebels use to infiltrate the forest moon of Endor. "The [shuttle's] tri-wings are such a strong graphic," Chiang observes. "We were trying to figure out, 'How can we imbue the same personality, but not copy it literally?' It finally came out where we get a similar graphic, but [based on] a TIE fighter and extending the wings so they become super tall. You get the classic 'H' of the TIE fighter, but it bridges the gap with the *Tydirium* shuttle."

The filmmakers also faced the daunting task of bringing the *Millennium Falcon* forward in time. "That was a delicate process, figuring out how far we could push that," Gilford observes. Chiang adds, "What we discovered is that you really couldn't add more to make it better. There are certain things you just can't improve on, and the *Millennium Falcon* is one of them!"

Even staying true to the “original” *Falcon* was no clear-cut task, though, as the ship’s construction had been modified for each film in the original trilogy. “We had drawings from *Hope*, drawings from *Empire* and drawings from *Jedi*,” Gilford explains, “and we had to go through and do an amalgamation of what we thought was the ‘truest’ *Falcon*.”

“We built about two-thirds of [the exterior],” Gilford continues, noting that the *Falcon* was the first design to go into physical construction at Pinewood. “We knew that in all probability it would be used for other films, so it made sense to invest in it and make sure it could be pieced back together. And we knew it would be onstage and it would be outside, so we built it in a way that could be modular [for ease of transportation]. Paul Hayes was the construction coordinator; with his team, he engineered how to build it.”

The *Falcon*’s interior was built on M Stage at Pinewood. “The set-decorating department was just unbelievable,” Gilford enthuses. “They studied every frame of film and every set-continuity still from the first movie. And we were really fortunate to have a guy named Mark Harris, who was an apprentice on *The Empire Strikes Back*. He knew every nut and bolt of that ship.”

Throughout the concept stage, Gilford says there remained “tons of crossover” among the various artists. “You’d go down a path with somebody, and maybe you’d come up to a wall, and you’d say, ‘Well, let’s give the next guy a chance to see where he could take it.’”

Additionally, certain designs would cross between the concept artists in the U.S. and the creature-effects department — supervised by Neal Scanlan — housed at Pinewood. Gilford explains, “There were times when J.J. thought maybe we were going down an avenue that was too traditionally science fiction or automotive, and he wanted something weirder or a little bit different, so we’d ask the creature guys to take a stab at it, and that was really successful.”

One result of this trans-Atlantic collaboration is the astromech droid



Come visit our showroom or call for our latest Magliner product catalog
We are the largest retailer specializing in Magliner customized products and accessories for the Film and Television Industry in the world



See us at the BSC Expo 2016 • Battersea Evolution Arena in London, England • January 29 - 30, 2016

Backstage Equipment, Inc. • 8052 Lankershim BL • North Hollywood, CA 91605 • (818) 504-6026 • Fax (818) 504-6180 • backstage@aol.com • www.backstageweb.com

Vega Lux PLUS

STUDIOLED FRESNEL

The DMX motorized ZOOM Fresnel by FLUOTEC®

Specially created for STUDIO and EFP* producers, photographers and filmmakers alike.

*EFP (Electronic Field Production)

FLUOTEC USA
www.fluotecusa.com
info@fluotecusa.com
 Tel.: 361-288-175

FLUOTEC
STUDIOLIGHT

- FRESNEL
- NEBULA
- STEPLESS DIMMING
- ZOOM 13-47
- CRI=90
- DMX 512
- ENERGY SAVING

Force Perspective

Right: Rey (Daisy Ridley) teams with astromech droid BB-8 on Jakku. This Niima Outpost exterior was built on location in the desert of Abu Dhabi. Below: Alex Hughes works on BB-8 in the creature-effects department.



BB-8, whom Abrams first illustrated with a Post-it sketch that was passed along to Alzmann. “It looked like a snowman without a chest,” Alzmann recalls, “one smaller circle on top of a bigger one. I spent about a month doing different versions of what the ‘drive ball’ could be, and at least in my mind it was always going to have an R2-style head.

“I picked orange as the color almost right away,” he continues. “It seemed like a good *Star Wars* color — we see it in the X-wing flight suits, and there’s something about orange that just immediately brings back 1977. The last I touched it, I designed a bunch of different ‘faces’ and tread patterns. Then it went to Neal Scanlan in London, and everything got finalized over there.”

While there was a close collabora-

tion between the art and creature departments, Gilford notes that Scanlan’s crew worked outside the production designers’ purview. “Same with Michael Kaplan,” Gilford adds, referring to the film’s costume designer. “On another movie, a production designer might be very heavily involved with things like stormtroopers, but Michael’s team was so strong. Everybody was developing at the same level and on the same timeline, and we’d all see how everything was relating and make sure it all wove together seamlessly.”

The production designers also enjoyed a close collaboration with cinematographer Dan Mindel, ASC, BSC, who joined the conversation early in preproduction. “We collaborated on

everything you can imagine as far as lighting and the logistics of shooting the sets,” Gilford says. “He was intrinsically involved in our department.”

Principal photography began on location in Abu Dhabi, where the desert landscape stood in for the planet Jakku. In particular, Gilford recalls that the scavenger marketplace Niima Outpost “was such a huge set. It was like building a whole town out in the desert. J.J. wanted to make sure you always saw the horizon through [all the structures] so you could really understand the vastness and loneliness of the landscape. We were very involved with Dan, making sure [everything] was facing the right sun direction.”

After Abu Dhabi, it was back to Pinewood, and from there the schedule called for a good deal of “leapfrogging,” as Gilford explains it, between the studio and locations that included RAF Greenham Common and Puzzlewood in England, and Skellig Michael in Ireland.

“We were outside on the [Pinewood] back lot, too,” Gilford notes. “In the opening of the movie, there’s a battle sequence [in a Jakku village] with stormtroopers and flamethrowers. We did that on the back lot, and then we struck that and turned it all into a big snowfield [for exteriors of the First Order’s Starkiller Base]. On the south lot, we had a huge castle-ruins set, and we did a huge [First Order] rally sequence in the Pinewood tank.”

All told, Gilford estimates more than 70 sets were built for *The Force Awakens*. But, he adds, “It’s tricky on this type of movie, because some sets were obviously massive, and some sets were cockpits or kind of postage-stamp process-screen sets. If you took in all those things, it would be well over 100.”

Throughout the sets, Gilford continues, “we reused pieces as much as we could.” As an example, he adds, “We used a lot of the same pieces for Star Destroyer hallways [and] the hallways for Starkiller Base. We designed what we called ‘cabinets’ — A, B, C and D cabinets. Think of them as tall boxes with

different angles on them. The way you configure them changes the look of a hallway; you could spin them upside down or add different filler pieces.”

Barry had used a similar technique when designing the interiors of the original Death Star. “J.J. was always trying to connect with how they did the first [*Star Wars* movies],” Gilford says. “He loved the idea of trying to do an homage to all of those great techniques.”

Another classic technique the filmmakers were able to employ was the use of a forced-perspective backing, which had been used, among other instances, for the detention-level hallway aboard the Death Star in *A New Hope*. “There’s a hallway scene in a Star Destroyer with Finn [John Boyega] and Poe [Oscar Isaac],” Gilford explains. “It was a really narrow hallway, so we thought we could get away with the one-point perspective of an extension painting.”

Scenic artist Matthew Walker made the hallway painting, as well as a huge extension for the snow-blanketed forest where Finn and Rey face Kylo Ren; this exterior environment was in fact a massive set built onstage at Pinewood. “Around the entire stage,” Gilford details, “all four walls [had] a giant backing that put the forest into infinity in any direction you looked. It took about three weeks to paint, and I remember watching [Walker] and his one assistant on a 50-foot scissor lift; the assistant was operating the scissor lift, dropping it from top to bottom, and the painter had these giant rollers to paint these giant trees. It was just phenomenal. It came out beautifully.”

Star Wars also popularized the idea of a “used-universe” aesthetic that in no small part can be credited to *Episode IV* set decorator Roger Christian’s repurposing of airplane scrap and military-surplus items. “That grounded the sets in reality,” Chiang explains, “because those individual pieces — even though you might not recognize them — were real pieces in our world.” ➤

BRIGHTER The Flat Fresnel

The F8-200

quantum
TUNED

Twice the power...
Flat as ever.



zylight.com

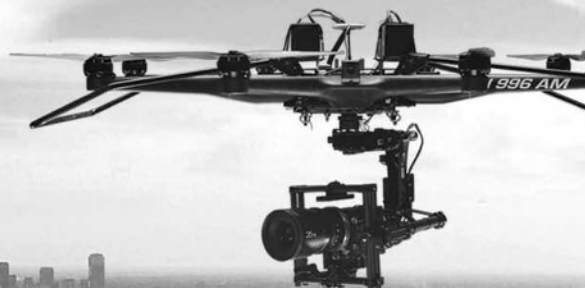
Distributed by:

USHIO

800.838.7446 | USHIO.com



AERIAL MOB™



LEADING FAA-APPROVED DRONE CINEMATOGRAPHY

CERTIFIED & EXPERIENCED LOCAL 600 CREWS

CUTTING-EDGE TECHNOLOGY & CAMERA SYSTEMS

AERIALMOB.COM

800.706.4662



APPROVED

Force Perspective



Top: Finn (John Boyega, left) and Poe (Oscar Isaac) hatch a plan aboard a First Order Star Destroyer. The background hallway for this set was a forced-perspective extension painting. Middle: Gilford on location in Abu Dhabi with a crashed TIE fighter. Bottom: Carter confers with Lucasfilm president and *The Force Awakens* producer Kathleen Kennedy in the Resistance-base set built at Pinewood.



For *The Force Awakens*, the task of procuring such items went to set decorator Lee Sandales. As Gilford describes, “There was so much he needed to bring to the desert in Abu

Dhabi, and we used a ton of it in Greenham Common for the Resistance-base airfield. It was massive amounts of stuff that Lee had to shop for, absolutely tons of found objects that

were art directed and kluged together to be other things. Given the sheer amount of stuff we needed, there was no other way to do it.”

As was the case with Mindel, Gilford stresses that the collaboration with visual-effects supervisor Roger Guyett was incredibly close, ensuring a smooth transition and a seamless handoff of the designs as the visual-effects team took the lead in postproduction. Further strengthening the bond between departments, Alzmann returned during post to work with Guyett and visual-effects art director Yanick Dusseault at ILM in San Francisco.

“In preproduction,” Alzmann notes, “it was like, ‘Here’s everything we’re hoping for.’ Once you’re in post, you now have the footage, and maybe you put in the design and it just doesn’t work. So there’s some redesigning and refiguring so that everything looks good in that frame of film.”

Carter emphasizes that with every piece of the production, from the concept art and script through the photography and visual effects, “the overriding idea is, ‘Do you feel like you’re really in this place?’ It’s a long time ago, far, far away, but it’s really right now, and right here, and reflective of us.”

Listening to Carter, one can’t help but think that the comparison to Obi-Wan Kenobi couldn’t be more accurate. His words — like Kenobi’s to a wide-eyed Luke Skywalker — evoke the stirrings of a connection to something vast and timeless. And so it’s fitting when, in the final moments of the interview, Carter offers, “The Force is real. Just as Han Solo says, ‘All of it.’ And the reason it’s real is because it’s actually something that can be expressed by us as artists through the cinematic form. Then people [see the movie] and they take it away; they can talk about it and they can believe in it, and they can make it their own. I think when people see the movie, they’re going to grasp that.

“I think there will be a kind of awakening,” Carter concludes. “And I’m glad it’s about *Star Wars*. I’m glad it’s about the Force.” ●



Mole-Richardson Co.

Where classic quality meets modern technology

Lighting Just Got Easier



SeniorLED

A 5k Equivalent LED
available in 5600K or 3200K



Vari-SpaceLED

Variable-Color LED Spacelite
ranging from 2700K to 5600K





Blurring the Line

Roger Guyett, *The Force Awakens*' visual-effects supervisor, discusses his team's mandate for a "seamless flow" between practical and digital.

By Noah Kadner



Roger Guyett recently celebrated his 20th year at Industrial Light & Magic, the groundbreaking visual-effects company founded by George Lucas. During his tenure, Guyett has been instrumental in creating ILM's visual effects for such major motion pictures as *Saving Private Ryan*, *Harry Potter and the Prisoner of Azkaban*, *Star Trek* and *Star Trek Into Darkness*, earning three Academy Award nominations along the way. *The Force Awakens* marks a return to the *Star Wars* universe for Guyett, who served in a similar capacity for *Star Wars: Episode III – Revenge of the Sith* back in 2005. In a conversation with *AC*, Guyett describes his duties on set, second-unit directing, and overseeing both ILM and other effects vendors for *The Force Awakens*.



American Cinematographer: The last time a major *Star Wars* trilogy began production was in 1997, when the contemporary visual-effects breakthrough was computer-generated imagery, as seen in *Jurassic Park*. Is there a similar shift for 2015?

Roger Guyett: What's really changed are the levels of finesse that we're able to apply to the shots. It's an absolute quantum leap in terms of the technology and the computing firepower that we have now. The level of innovation makes this a very different world. It's a very serious upgrade on the same concepts.

Your audience also has a very keen eye for the ways you might light something. The physically based lighting models that we use now are such a vast improvement, and superior to even what we could do on *Sith* — it's a game-changer. For this show, we've introduced a number of major innovations into the ILM pipeline. Besides a more effective way of lighting, we've also upgraded our simulation pipeline; a lot of the more natural effects — like smoke, dust, or anything breaking apart or exploding — are way more advanced than what we were able to achieve 10 years ago.

How much of ILM's animation software is proprietary?

Guyett: A lot of the basic tools are quite often off-the-shelf, and then



Opposite: With the help of visual-effects artists at Industrial Light & Magic, the iconic *Millennium Falcon* weaves around two TIE fighters' laser blasts. This page, top: From the bridge of a *Star Destroyer*, *Kylo Ren* (Adam Driver) watches as *Starkiller Base* launches an attack. Bottom: Visual-effects supervisor Roger Guyett on set at Pinewood Studios.

we do a lot of proprietary upgrades. We work with [Pixar's] *RenderMan* as our main rendering software. We also use [Autodesk's] *Maya* [for 3D animation], and it's a fairly open-source kind of environment. At the same time, the level of experience at the R&D department here at ILM is second to none. They're able to add a [layer] of proprietary software on top of those tools that really lifts everything to the next level — adding some very specialized elements to make the tools more effective and

detailed, or the rendering more photorealistic. Besides the toolset, it's ultimately the quality of our artists that really makes a huge difference, and ILM has attracted some of the best in the world.

Are on-set surveying/reference photography and scans still critical?

Guyett: You can argue both ways on that, because you can get the work done with a very small level of information these days. But to me, to get to that higher quality level, it's really all in the details. That's why we do a lot of

Blurring the Line



Top: Digital-effects supervisor Daniel Pearson added sparks and lightning effects up and down the blade of Kylo Ren's lightsaber to emphasize its erratic, "hot-rod" nature. Middle: First Order troop transporters and Kylo Ren's shuttle return to the Star Destroyer *Finalizer* in an entirely computer-generated shot. Bottom: Practical and digital effects were frequently combined for the film's battle sequences.

painstaking research on the environments we're trying to put our elements into. If we're re-creating a desert, for example, we do a lot of research into how those kinds of environments and materials behave. When we're match-

ing, say, to the *Millennium Falcon*, obviously we built a practical set for the interior and we also built a partial exterior.

You want the best possible match so your work seamlessly flows from the practical into the digital world. We do a

lot of scans and we get a lot of data about different lighting conditions. You could always just 'get by,' but my intention is to make it as seamless as possible. To do that, you really need to put some work in.

What about considerations for 3D and Imax?

Guyett: We have a strong relationship with Stereo D for 3D conversion. The film is going to be released in 3D and Imax, so we may change or adapt specific shots a little bit for that process. The conversion process is so efficient now that it allows you a bunch of choices. It's a very flexible environment, and Stereo D is doing a really great job of converting this movie.

What are your thoughts on shooting film versus digital?

Guyett: Dan Mindel [ASC, BSC], J.J. [Abrams] and I are very fond of using film. Every movie that I've done with J.J. has been shot on film. The anamorphic format is my favorite way of working — it's a great image. ILM has a huge background in understanding how film works, and our pipeline is completely set up to do that. I'm sure this *Star Wars* will be one of the last movies shot on film at this scale. It's an increasingly difficult medium to work in, because the lab support is so minimal. Even in Los Angeles, it's becoming more and more difficult to find the right lab to do the work. To me, [because of]

the way that film captures the light, it is still my favorite format.

Can you share some statistics about the effects effort?

Guyett: *The Force Awakens* contains more than 2,000 effects shots. Part of our mandate was trying to photograph as much as possible in-camera, [but] by its very nature, as soon as I say ‘*Star Wars*,’ it’s a huge visual-effects movie. We’ve worked really hard to blur that line between the practical and the digital. At the end of the day, a huge part of this movie is visual effects; I think you’d be shocked at the environment work we did, where literally everything is digital in the frame. We have all of the major offices at ILM working: Singapore, Vancouver, London and San Francisco. We’ve also used additional effects companies, including Hybride, and Virtuos and Base FX in China. Ultimately, thousands of people are working on this.

Were any miniatures photographed?

Guyett: That was something we seriously thought about, but putting together a team that would be big enough to accomplish the task was difficult. There just aren’t those facilities anymore. When we started, I had earmarked a number of sequences where I felt we could use miniatures. We did some tests of miniatures versus digital, but it was shocking how impressive the CG simulations and the digital builds were. It was very difficult to argue with the flexibility that using digital techniques gave us. Even for the recent *Star Trek* movies, we shot some miniatures. We realized just how far the digital technology has come.

For lens artifacts such as flare and condensation with CG cameras, what’s the creative process?

Guyett: What we set out to do was really try to imagine, ‘If you actually photographed these shots for real, what would happen? How would you be affected by the equipment, and what would your constraints be?’ There is no limit in visual effects, and that might not be a good thing. Our goal was to try and

stay within the visual language of the first *Star Wars* movie, which was [released] in 1977. What would you have done then, and what would the visual byproducts have been if you actually photographed something? What can you put in front of the camera to blur that line between reality and the work in post?

Quite often in a real film environment, the light may not be ideal. You might be shooting a certain way that might create certain artifacts — i.e., you might be wide open on your aperture or have depth-of-field issues. How would the film behave if you were flying through a fire? We wanted some of the real world to come into what we do, and blemishes are part of that world.

Are these blemishes created digitally, or are they stock elements?

Guyett: All of the above. We have a library of photographic elements at ILM. We also draw on other visual references [relating to] how something might behave. When we create phenomena that may be hard to imagine, we do research and find an enormous amount of references [in terms of] how that event might be photographed. Then we try to re-create those moments where some blemishes happen. We do lens mapping to determine how the lens might breathe and the size might change as you shift focus. We see how the image is being distorted as you change the lens. We have a huge library of things we can refer to.

What about motion-capture characters?

Guyett: We mo-capped Andy Serkis as Supreme Leader Snoke and Lupita Nyong’o as Maz Kanata. We’ve built a system around Vicon motion-capture cameras, but the technology is constantly changing. We’re trying to capture the full performance and [all] the nuance. We’re also using a sophisticated array of facial cameras. We were able to record all of that up close and personal with a bunch of different technologies, including IBC — image-based capture. [The team from the Imaginarium, the London-based digital

NEW LED ARRIVALS



SIOPANEL
SOFT LIGHTING | REDEFINED



SL1
POWERFUL VALUE



Creamsource Sky
THE SKY HAS NO LIMIT



SUMOSPACE
BRIGHTER | LIGHTER | BETTER

DISTRIBUTED BY

MACCAM
STUDIO LIGHTING SPECIALISTS

excellence • expertise • edge

SALES | RENTALS

MACCAM • 818-780-5600 • www.maccam.tv

•| Exploring All Possibilities •|

While Roger Guyett supervised the overall visual-effects work for *The Force Awakens*, Pat Tubach, a visual-effects supervisor for ILM, helped lead the company's San Francisco, Vancouver and Singapore facilities. His effects credits include *Star Trek Into Darkness*, *Star Wars: Episode II—Attack of the Clones*, *Episode III—Revenge of the Sith*, and all four live-action *Transformers* features. Tubach chatted with *AC* about his experiences working on the seventh installment of the *Star Wars* saga, both as a filmmaker and a longtime fan.

American Cinematographer:
How is the work divided between different ILM facilities?

Pat Tubach: We tried to split it up as smartly as we could, and that was mostly [by individual] sequences. We tried to focus each different facility on a specific part or specialty. For instance, London led the character work for Maz Kanata and Supreme Leader Snoke. ILM San Francisco did a huge breadth of work across the entire film. ILM Vancouver focused a lot on the Takodana castle battle sequence and some of the third-act sections that I can't talk about now. Singapore did a lot of work on the TIE-fighter hangar-escape sequence, which occurs early in the movie.

How are assets shared?

Tubach: We've done work globally for a while at ILM. This movie is in so many different facilities, all using a similar pipeline. Vancouver is on the same network and time zone as San Francisco, so geographically that works well. London and Singapore have to be on their own separate networks.

We are designing models that will become iconic *Star Wars* assets well beyond this one film. And knowing that Lucasfilm and Disney as a whole will be using these assets for other purposes and additional films, we set up an airtight process called the



'universal asset pipeline' for building the assets and sharing those across facilities.

Describe the development of Starkiller Base's ultimate weapon.

Tubach: That was an interesting sequence—it started out with J.J. wanting it to look like a major rally to show the power of the First Order. We wanted everything to feel like you could physically build it and feel the practical rather than computer effect, and create a crowd scene at believable scale. We knew we had a big challenge on our hands. We did a lot of motion-capture and movement cycles of the stormtroopers, and we had some practical guys shot on the parade ground for the foreground. We did a mix of practical and CG up front, CG troopers in the back, and created the view from various plates we'd shot in Iceland. There are also some gigantic flags hanging behind General Hux [Domhnall Gleeson], which all had to be simulated.

Was there a conscious effort to visually reference the original trilogy?

Tubach: We have access to the Lucasfilm archives, so we went up to

Skywalker Ranch with the modeling guys and spent multiple days going through and photographing all the old ships. We used actual scanned pieces of them in new designs and new ships, so it all feels like it comes from the same rooted place. For example, visual-effects art director Yanick Dusseault took a model of an old Super Star Destroyer and put it on its side and embedded it into a mountain, and portions would poke out from the landscape. You've got that DNA to immediately feel like part of what's come before. All of that is really driving the look of this film, going back to old ideas with a fresh take.

Were there any special improvements in ILM software made for *The Force Awakens*?

Tubach: There's a lot of complex destruction at the end of the movie with a mix of materials like snow, rock, ice and water. One of the limitations of simulations is the mix of a variety of materials colliding against each other. R&D engineer Rick Hankins rewrote our Zeno simulation engine to accommodate that. All of that stuff can now interact directly, rather than be simulated separately and composited later.

Was there a particularly challenging shot or sequence?

Tubach: There wasn't one shot that required extra attention or revisions; it was all of the shots all the time! There was no such thing as a 'one and done.' We needed to explore all of the possibilities, and everyone understood that. It resulted in the best possible version of this film. We never allowed ourselves to be easily satisfied until we'd really got it.

Were any old-school techniques used in favor of new technology?

Tubach: I think BB-8 is a really great example of that. A lot has been said about how awesome the practical version was, and we did a lot of CG BB-8 as well. So the question comes up—why not just do CG BB-8 all the time because you can do whatever you want? It was really key having that droid be a real character that everybody on set

■ Blurring the Line

reacted to, because he's real and he'll come across as real in the movie.

There are massive set extensions and massive CG environments. We worked hard to make people forget about all that. I remember watching *Empire [Strikes Back]* and *Return of the Jedi* with my kids, and they were amazed by what they were looking at and not sure how the effect was achieved. We wanted to capture that same feeling.

As a *Star Wars* fan, did any aspect of making this movie really stand out for you?

Tubach: I was on set one day and J.J. was staging a shot that's in one of the trailers, where Han and Chewie walk onto the *Millennium Falcon* and Han says, 'Chewie, we're home.' J.J. was blocking out their entrance, and they stepped onto the *Falcon* and lined up in the frame just like this vintage *Star Wars* poster I've had on my wall for years. I audibly gasped and other people on the crew had the same experience. That moment really took me back to my childhood and watching the first film. I thought right then that this movie is going to do the same for a lot of people, especially if we get everything right in post. There will be some image that they'll see in this movie that's going to remind them so much of what they've dreamed about and obsessed about over the years, and it's a great visceral response. I'm very excited that people are going to have the same reaction that I did — basically, geeking out.

— Noah Kadner

studio co-founded by Serkis,] also helped us out on set. We set up a number of HD video cameras to capture the actor walking and doing [his or her] thing. Then we'd analyze those video images, and by triangulation we'd figure out the actual motion of the performer. At the same time you'd have the [facial cameras] capturing their performance.

We did a lot of rehearsals, because when we're on set you want as small a footprint as possible. We also did stuff in the motion-capture studios with an optical motion-capture system, and we used our own stage here at ILM on occasion, as well. The idea is to translate the actor's performance into believable emotion and a believable character.

Describe the process of creating digital set-extensions for *The Force Awakens*.

Guyett: Our goal was to build as much as possible, but the reality is that the art department can only build a fraction of what's required. For example, the [Star Destroyer] hangar required a huge set extension, and even some of the smaller corridors [required digital extensions]. The reality is that digital extensions are part of the modern filmmaker's toolbox. For the prequels, George really built minimal sets, as he just wanted absolute flexibility in post. J.J.'s approach with Dan was to be more encouraging to the art department.

We said, 'Let's build this length of corridor, and with sleight of hand we can turn it into 100 feet.' If you build the foreground and light it, then extending it can bring a different level of realism. We definitely built some substantial sets, but in the grand scheme of things, a lot of what you see is digitally enhanced. The trick is not that you're doing it, but that no one notices.

So the goal was a more tangible-looking film?

Guyett: We were a group of people who were incredibly honest about what we wanted to achieve. The way that you photograph something, and the light that you are photographing in, is the foundation of everything

our team does. If you want something to look like it was photographed in an exterior environment, the best way is to shoot it outside.

[Production designers] Rick Carter and Darren Gilford completely embraced our approach of finding the best and most efficient path to build things within constraints. You have a certain amount of stage space and you have a certain schedule that you're trying to make. So you have to think, 'Is it worth building this thing completely, or is it better to build a piece of it? Or if we build a set, how can we turn it into something else?' There was a tremendous amount of collaboration between all of the departments, and that goes for Neal Scanlan and the creature department [that he supervised], as well.

How much of the film was previsualized?

Guyett: We didn't do as much previs as you might have expected. If you look at the timeline of the movie, we started shooting in early 2014 and J.J. had really finished *Trek* in mid-2013. That meant he had six or seven months completely free to work on the script with Larry Kasdan. That was the period in which you potentially would have done a lot of previs. [Working with previs company Halon Entertainment,] we prevised a small number of sequences that we really thought would be key. Then we didn't so much previs individual shots, but the environments, like a virtual scouting process. J.J. and I have a lot of experience doing visual effects, so we're more able to think in terms of how a shot might work [with the understanding that] a lot of the shot contribution might come in post.

How were the lightsabers in *The Force Awakens* created differently from those in previous *Star Wars* films?

Guyett: Effects-wise, when you're seeing a lightsaber in the early movies, it's a 2D rotoscoped glowing bit of light-animation placed over the film. Now we're able to build a lightsaber in 3D and change its behavior; it's a much more complex thing.

The huge thing for the

Blurring the Line



Top: General Hux (Domhnall Gleeson) addresses his troops in a shot with a practical foreground and a digitally extended background. Middle: Director J.J. Abrams discusses a scene with Lupita Nyong'o, whose motion-capture performance provided the foundation for the CG character Maz Kanata. Bottom: An X-wing gives chase to a TIE fighter above the planet Takodana.

lightsabers was that we built prop lightsabers that were actual lights. Even on *Revenge of the Sith*, it was guys fighting with sticks; we were faking all of the interactive light. Dan and I, with the visual-effects team, set out to actually build a lightsaber with a string of LED lights [so] we could then photograph a true light source. That small step is effectively an enormous step; it transforms the way you might light something with a level of realism, because that thing is really shining light. That was a huge deal for the filmmaking process.

Are any specific sabers different?

Guyett: Kylo Ren's is very complicated — it's a more hot-rod lightsaber that he's constructed himself. It has glitches and matches his character in that it's way more gnarly and out of control. That was fun to put together. Daniel Pearson, our digital-effects supervisor, did a lot of effects-sparks and lightning that travels up and down the blade to show how much more erratically it behaves than a normal lightsaber.

Describe the effort put into realizing BB-8.

Guyett: Once we had a good idea of what we were trying to achieve, BB-8 [became] a collaboration with the creature department and Neal Scanlan's team. We were pragmatic about our expectations and realized that the practical droid would sometimes be replaced

with a digital version. Even in relatively simple setups, we just admitted we were going to have some rig removal. Neal and I analyzed the ways the puppeteers might operate BB-8, and we devised a number of different systems for how the rigging would work, so we could switch between different setups and keep the rigging off-camera as much as possible.

One or two puppeteers typically operated BB-8, and [the CG BB-8's] acting was defined by the practical droid. Paul Kavanagh, the animation supervisor at ILM, [understood] the character of BB-8 and would work with the puppeteers, so you'd end up with a very consistent idea of its behavior. JJ. could completely direct BB-8 on set, and we all got used to its personality, just like another actor. BB-8 has got a great personality, and once we defined that, it was so much easier to come back to in post. Even though a lot of the BB-8 shots are done digitally, you've already defined the character clearly when shooting the movie. A lot of the stuff was physically impossible to completely puppeteer, but it gave us this incredible foundation to work from.

What changed most from the original plan versus what you actually shot?

Guyett: The accident with Harrison Ford completely changed the schedule, of course. Obviously, he's in the movie a lot and we realized there was no way of continuing past a certain point without him. We had to close the production down for a little while.

As a director, JJ. is so quick on his feet. We'd go to a new location or set, and he'd think of new ideas or new ways of using the space. He's very efficient and has a tremendous understanding of how to use the camera in an efficient way — and always tell the story! I always learn a lot from working with these guys — more than anything, what an incredible collaboration filmmaking is. There's really no one better to work with than JJ. and Dan Mindel. ●





F I L M E Q U I P M E N T R E N T A L

SHOOT IN MEXICO

F I L M P A C K A G E S

35MM & 16MM FILM CAMERAS

DIGITAL CINEMA CAMERAS

VIDEO FULL HD CAMERAS

C A M E R A A C C E S S O R I E S

L E N S E S · L I G H T I N G

D O L L I E S · C R A N E S

F U L L Y E Q U I P P E D T R U C K S

G R I P · G E N E R A T O R S

E X P E N D A B L E S

S O U N D S T A G E

GUADALUPE I. RAMÍREZ 763, SANTA MARÍA TEPEPAN, XOCHIMILCO C.P.16020,
MÉXICO CITY, T. +5255 5678 1113 / +5255 5678 1483

info@cttrentals.com
www.cttrentals.com

New Products & Services

• SUBMISSION INFORMATION •

Please e-mail New Products/Services releases to newproducts@ascmag.com and include full contact information and product images. Photos must be TIFF or JPEG files of at least 300dpi.



Cineo, Cinelease Collaborate on Quantum

Cineo Lighting and Cinelease Inc. have collaborated to produce the Quantum120 LED fixture. Drawing 1,200 watts, the 4'x4'x6" Quantum120 outputs up to 75,000 lumens of high-quality, color-correct light. Even with its substantial size, the Quantum120 weighs only 65 pounds, inclusive of its integrated power

supply and electronics. The fixture boasts passive, completely silent cooling with no fans.

The Quantum120 required the development of proprietary LEDs that carry the same color quality as Cineo's Remote Phosphor fixtures; the unit features four proprietary 585mm x 585mm metal ceramic LED modules, each with 1,280 CineoColor LEDs. Color temperature is completely variable from 2,700K-6,000K, with presets at 2,700K, 3,200K, 4,300K, 5,600K and 6,000K. Color accuracy is excellent at all color temperatures, with a CRI of 97 at 3,200K. Correlated color temperature remains constant and flicker-free throughout the 0-100-percent dimming range, and output is consistent at any CCT. The Quantum120 can be controlled locally or remotely and is configurable via RDM.

The fixture can be fitted with standard 4'x4' frames and comes with a removable Snapbag soft box. Multiple mounting options are available, including a heavy-duty yoke.

The Quantum120 is available for rent exclusively from Cinelease in all of the company's rental locations.

For additional information, visit www.quantum120.com, www.cineolighting.com and www.cinelease.com.

Panavision Opens at Pinewood Atlanta

Panavision has opened a satellite office at Pinewood Atlanta Studios. The high-tech workspace houses a full range of filmmaking equipment with a large area for prep and testing, and access to the company's specialists in production solutions.

Pinewood Atlanta Studios opened in February 2014 and consists of 11 sound stages, more than 500 acres of back lots, and offices and other amenities. It has become a hub for the international and U.S. production community needing studio accommodations in the Southeast.

Robert Presley, a veteran camera operator and Steadicam specialist who joined Panavision as a sales and marketing executive in January, serves the needs of feature and television productions shooting in the region, along with a full team of experienced technicians and support personnel.

Panavision's main Atlanta office in West Midtown will continue handling equipment rentals and services for productions filming throughout the Southeast area. The company has serviced many productions, including the features *Ant-Man* and *Captain America: Civil War*, over the past year.

"Panavision is committed to helping filmmakers regardless of where they are shooting," says John Schrimpf, Panavision's VP of U.S. regional operations. "By investing in the locations that are providing a thriving environment for the creative community, we can address the needs of our clients with extraordinary speed and precision."

For additional information, visit www.panavision.com.



Anton/Bauer Powers Cine Series

Battery- and charging-technology provider Anton/Bauer, a Vitec Group brand, has announced the Cine battery series, which is designed to provide a safe and durable mobile power solution for professional cinematographers working with digital cinema cameras.

The Cine series delivers 12 amps of continuous power and incorporates Fuse Link technology, which — in the case of a cell anomaly — provides protection to surrounding battery cells and prevents catastrophic damage. The battery line also features multiple sensors to detect temperature and over-current states, ensuring optimal battery performance during regular use.

Ideal for camera-stabilizer systems and rail-mounted cameras, the Cine batteries function on all existing Anton/Bauer chargers. For additional convenience, the Cine battery series includes a PowerTap to power auxiliary accessories such as monitors, lights, wireless receivers, and any other 14-volt accessory.

The Cine series also includes an extremely accurate LCD that provides users with run-time information in hours and minutes. When the battery is detached, the LCD screen will display battery life as a percentage of capacity, allowing the user to effortlessly track usage.

Now shipping, the Cine series is available with both Gold Mount and V-Mount connectors.

For additional information, visit www.antonbauer.com.





Zylight Expands LED Offerings

Zylight, a leading manufacturer of innovative LED lighting solutions, has unveiled its "silent" F8-300 LED Fresnel. Engineered specifically for quiet studios and venues, the F8-300 delivers the equivalent brightness of a 600-watt HMI Fresnel while using passive cooling instead of an internal fan.

Built on Zylight's award-winning F8 platform, the F8-300 uses quantum-dot LED technology to deliver a high quality of light. Available in tungsten (3,200K) or daylight (5,600K), the fixture boasts a high CRI (color rendering index) as well as a high TLCI (Television Lighting Consistency Index). It offers traditional, single-shadow Fresnel beam shaping, as well as an adjustable beam spread (16-70 degrees) with a patented focusing system for spot and flood operations.

While drawing only 300 watts of power, the F8-300 delivers more brightness than a 2K tungsten fixture. Constructed with aircraft aluminum and composite reinforced thermoplastics, the water-resistant F8-300 has an IP54 rating, enabling it to deliver in challenging environments and weather conditions.

Zylight has also begun shipping its Newz compact on-camera light. Designed for broadcast news and other run-and-gun shooting situations, the Newz features custom barn doors and a unique integrated articulated arm that allows shooters to easily adjust the height and angle of the light. Plus, the Newz is water-resistant (IP54 rating) for reliable operation in extreme weather conditions.



With its proprietary LED matrix, the Newz produces a soft yet punchy light with true color reproduction similar to the company's F8 LED Fresnel product line. A fully dimmable white light with variable color temperatures from tungsten (3,200K) to daylight (5,600K), it provides a 60-degree beam spread at full width half maximum (FWHM) for a soft falloff around the edges. Plus, an integrated strobe function adds versatility for DSLR applications.

The Newz also features an integrated one-touch quick-release mount for more efficient setup and breakdown, as well as ZyLink, Zylight's wireless technology, so it can be linked to multiple Zylights for simultaneous remote control. It includes a worldwide AC power supply, but can be powered by a 7.2- or 14.4-volt camera battery through its integrated D-Tap cable. An optional hot-shoe accessory will be available for DSLR shooters using the strobe function.

For additional information, visit www.zylight.com.

Radiant Images Opens New Doors

Radiant Images, an award-winning rental house and hub of digital-cinema innovation, has expanded and moved into a 28,000-square-foot facility in Northeast Los Angeles to better meet the needs of its film-making clients. The new facility, which is nearly triple Radiant's previous space, is located at 2702 Media Center Drive in the Los Angeles Media Tech Center in the Glassell Park neighborhood.

Radiant's continued growth — most recently in testing and developing virtual-reality technology — necessitated the move to a much larger space with enhanced conveniences and amenities for clients. "Radiant's focus has always been to put the needs of our clients first, and with this move we are doing just that by taking all of our innovations and the solutions that filmmakers rely on and putting everything under one roof," says ASC associate Michael Mansouri, vice president at Radiant Images.

Designed by architects at Samwon Design and built to meet the company's specifications, the new location features an expanded prep area for gear setup with an adjacent client kitchen and lounge; ample



HEADS ARMS CARS

**FOR ALL YOUR
TRACKING NEEDS.
FROM SOFT BEAUTY
TO ROUGH TERRAIN.
SAND OR SNOW.
WET OR DRY.
EAST OR WEST.**

- 12 CAMERA CARS
- 12 RUSSIAN ARMS
- 16 GYRO STABILIZED HEADS

filmotechnic
USA

FILMO-USA.COM

**Los Angeles / Detroit
1-310-418-3311**





parking; easy freeway access; and a dedicated wing to house Radiant's VR division, which was created in partnership with VRLive, a virtual-reality live-streaming network that delivers 360-degree content to any mobile device anywhere. The VR wing features a demo floor for testing custom VR creations and encompasses Radiant's R&D efforts in digital-cinema technology.

The building is located on the 4.17-acre campus known as the Los Angeles Media Tech Center, which is also the creative campus of choice for such tenants as Sony and Point 360, a digital film lab.

Radiant will continue to provide a high-precision lens and sensor diagnostics room for on-site testing, an in-house engineering team, client conference room, experienced technicians and rental agents, and a deep inventory of leading-edge digital cameras, solutions and gear.

Radiant Images is open from 7:30 a.m. to 6:30 p.m., Monday through Friday, with after-hours and weekend availability as needed.

For additional information, visit www.radiantimages.com.



Redrock Micro Accessorizes Mirrorless Cameras

Redrock Micro has announced a line of Mini Rig camera supports for shooting video with mirrorless cameras. Mini Rigs

reduce the size and price of cinema-style rigs to fit with smaller, lighter cameras and shooting styles.

Mirrorless cameras record high-quality video, but their small size makes stable shots difficult to obtain — and while built-in optical stabilization is good for photos, it doesn't help when moving the camera during video recording. Redrock Micro's Mini Rigs are available in three basic configurations, which can be modified or expanded to exactly match the user's needs, with support options to attach camera-top accessories. The three configurations comprise the Mini Handheld Rig, for fast and stable run-and-gun operation; the Mini Shoulder Rig, for comfortable all-day shooting; and the Mini Studio Rig, for shooting with a tripod or dolly.

Mini Rigs can be expanded into virtually any type of compact or cinema-style rig using Redrock's family of more than 400 accessories. Redrock products are designed and manufactured in the USA and come with a lifetime warranty.

For additional information visit store.redrockmicro.com.



PAG Links Gold-Mount Charging

PAG has introduced the four-position PL16+ simultaneous battery charger for use with the company's PAGlink Gold Mount Li-Ion batteries. The PL16+ greatly reduces the number of chargers required to manage a large PAGlink Gold Mount battery inventory.

With the PL16+, four 94-watt-hour PAGlink Li-Ion batteries can be fully charged in less than six hours, eight in less than 12 hours, and 16 in less than 24 hours. It is also possible to charge a maximum of 32 batteries — eight linked on each position — without user intervention.

The high-powered PL16+ charger uses the available current efficiently to fully charge each battery in the fastest way possible, ensuring peak performance and a longer cycle life. The intelligent batteries manage their own charging safely, and can be left to top-up on the charger. The batteries display their individual charge status on a built-in display.

The PL16+ is quiet, cool-running and compact. It features a tough steel case and weighs only 3.5 pounds, making it easy to transport and suitable for location use.

For additional information, visit www.paguk.com.



BBS Lighting Offers Remote Control

BBS Lighting has introduced the Remote Dimmer for its popular Area 48 Soft Remote Phosphor LED light system. The state-of-the-art unit fits in the user's hand and allows single or multi-fixture 16-bit dimming of Area 48 Soft fixtures smoothly from 100 percent to blackout.

Overriding the settings of the Area 48's on-fixture controls, the compact Area 48 Remote Dimmer utilizes a rotary knob with numerical settings to allow the lighting technician to easily and precisely dial-in any desired light intensity. An on/off switch toggles the output between blackout and the chosen setting. A single Remote Dimmer can control, in unison, a virtually unlimited number of Area 48 Softs that are connected via DMX 5-pin cabling; with multiple Area 48s, the Remote controls a master fixture (with current BBSNet software) that overrides the on-fixture software settings of all the Area 48s in the chain.

The Remote Dimmer plugs in, via 4-pin connector, between an Area 48 Soft and the fixture's Power Supply Unit (PSU) or battery. Up to a 16' (5m) cable can be used when the light is powered via battery, while up to a 32' (10m) cable works when the light is powered via the Area 48 PSU.

Built for the rigors of on-set or location work, the sturdy unit weighs just 12 ounces and measures 5.25" long, 2.25" high and 1 5/8" wide.

Area 48 Soft lights offer accurate color rendering (98 TLCI) and soft output comparable to a 1,200-watt traditional soft light. Interchangeable phosphor panels enable quick changing between daylight, tungsten, chroma green and chroma blue. The Remote Dimmer works at any color temperature.

For additional information, visit www.bbslighting.com or, in Europe, www.brothers-sons.dk.

Vü Filters Adds ND, Drop-in Holders

U.S.-based optical design company Vü Filters has announced two drop-in filter holders (75mm and 150mm) and a broad selection of accessories to complement its range of products. The Vü 75mm and 150mm Professional Filter Holders are precision-machined from high-quality aluminum and hand-assembled with care and attention.

Despite sharing similar features, the filter holders are designed for different purposes, photographers, cameras and lenses.



Photographers and filmmakers using mirrorless cameras will benefit from the lighter weight and smaller package of the 75mm holder system. For photographers and filmmakers using super-wide telephoto lenses from Canon, Nikon, Sigma and Tamron, the Vü 150mm Professional Filter Holder System features specific lens rings for these specialty lenses.

Vü Filters has also unveiled a range of 75mm, 100mm and 150mm neutral-density and graduated neutral-density filters. These filters are constructed from high-quality German Schott and German Formulated Optics and feature the same special coatings and level of care and attention that all other Vü products benefit from.

Vü Filters' products are exclusively distributed by MAC Group in the United

States and are available for purchase at a growing number of retailers around the country.

For additional information, visit www.vufilters.com.



Light Iron Grows Episodic Division

Light Iron, part of the Panavision family of companies, is expanding its Episodic Division with the addition of colorist Jeremy Sawyer (pictured) and new infrastructure dedicated to television services.

Light Iron President Michael Cioni, an ASC associate member, notes that the expansion comes in response to the unique needs of television clients. "We've never believed in a one-size-fits-all approach to post," he notes. "Episodic content moves at a different pace and duration than features, and this expansion allows us to support our television clients as equally as we support our theatrical clients."

The physical expansion includes a second TV bay, a new online room, and a dailies department for in-house, overnight dailies at Light Iron's Los Angeles facility. A similar expansion is planned for the company's New York facility early this year. In both cases, new hardware — such as UHD and HDR monitors and dedicated SAN storage — has been added specifically for television workflows.

The personnel expansion is led by the hiring of Sawyer, who has colored *The Walking Dead*, *The Closer*, *South Park*, *Major Crimes*, *Limitless* and *The Affair*. Light Iron will be announcing additional hires for the Episodic Division in the near future.

For additional information, visit www.lightiron.com. ●

APT-4.com



Telecine & Color Grading

"Jod is a true artist with a great passion for his craft."
— John W. Simmons, ASC

Contact Jod @ 310-713-8388
Jod@apt-4.com

HOLLYWOOD.PL
Beyond the Dream:
Personal Roads to the Silver Screen

The incredible stories of 23 acclaimed Polish filmmakers that collectively reveal a nuanced narrative about the immigrant experience, finding happiness and making dreams come true.

THE ASC STORE
WWW.THEASC.COM

International Marketplace

50 YEARS. STILL A CLASSIC.



**Super 8
Cameras, Film,
Processing
& Scanning**

PRO8mm
NOW IN 2K

2805 West Magnolia Blvd., Burbank, CA 91505
Phone: 818-848-5522 • www.pro8mm.com

**Max-Out
420mm/300mm
16.5" & 11.8"
Fresnel
Lenses**

Heat strengthened
lens replacement for
most lighting fixtures
now at super low prices!

Light's Action Company!
MAXI Fresnel Lenses | MAXI HMI PAR Lenses | Flat Safety Lenses

lightsactionco.com
818.881.5642 | lightsactionco@earthlink.net

Always
Ask For
MAXI
Lenses

Improving on what nature does naturally.

POWERMILLS

**ALUMINUM
REFLECTORS**

PowerMILLS now offers high quality aluminum reflectors developed to provide flawless reflective qualities and engineered specifically for HMI lighting fixtures.


More information: **818.345.7732**.

POWERMILLS
wally@powermills.com | www.powermills.com




©Copyright 2016, PowerMILLS. All rights reserved.

CAVISION



New! Next-gen Director's Finder



ONLINE STORE: WWW.CAVISION.BIZ
604-298-9053 info@cavision.com www.cavision.com

**CINE
SADDLE**

www.cinekinetic.com

Tel: 212-202-0675

USED FILMEQUIPMENT
from Germany

filmcameras, lenses,
lighting & dollies

pille
FILMEQUIPMENT

Please visit our website
www.used-filmequipment.com

BLU II Camera Dolly
Starting at \$1095

check out website
for all the details



Fully adjustable Multi-Surface
many more products available
www.WILLYSWIDGETS.com

**Mole
LED**
Variable-Color

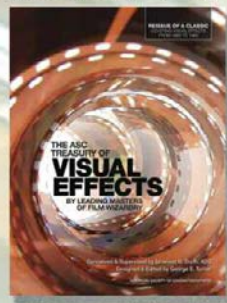


Adjustable color temp
from 2700K to 5600K

100W Vari-Mole LED

Mole-Richardson Co.
info@mole.com • 323-851-0111 • mole.com

A MUST HAVE



**THE ASC TREASURY OF
VISUAL EFFECTS**
BY LEADING MASTERS
OF FILM WIZARDRY

REISSUE OF A CLASSIC
COVERING VISUAL EFFECTS
FROM 1895 TO 1982

To order, visit our website:
www.theasc.com

SUPER16INC.COM
Top-notch camera and lens servicing

Anamorphic lens servicing!

T: 607-205-1001 bernie@super16inc.com
Toll-free: 877-376-6582 FREE ESTIMATES

BACK ISSUE SALE
\$1
SELECTED ISSUES



Visit our website
for details
www.theasc.com

Classifieds

CLASSIFIED AD RATES

All classifications are **\$4.50 per word**. Words set in **bold face** or all capitals are **\$5.00 per word**. First word of ad and advertiser's name can be set in capitals without extra charge. No agency commission or discounts on classified advertising. **PAYMENT MUST ACCOMPANY ORDER.** VISA, Mastercard, AmEx and Discover card are accepted. Send ad to **Classified Advertising, American Cinematographer, P.O. Box 2230, Hollywood, CA 90078.** Or FAX (323) 876-4973. Deadline for payment and copy must be in the office by 15th of second month preceding publication. Subject matter is limited to items and services pertaining to filmmaking and video production. Words used are subject to magazine style abbreviation. **Minimum amount per ad: \$45**

EQUIPMENT FOR SALE

4X5 85 Glass Filters, Diffusion, Polas etc. A Good Box Rental 818-763-8547

16,000+ USED PRODUCTION EQUIPMENT ITEMS
www.ProVideoFilm.com
www.UsedEquipmentNewsletter.com
888 869 9998

HOLLYWOOD STUDIO ANTIQUES
www.CinemaAntiques.com
BUY-SELL-TRADE

EQUIPMENT FOR SALE

World's SUPERMARKET of USED MOTION PICTURE EQUIPMENT! Buy, Sell, Trade. CAMERAS, LENSES, SUPPORT, AKS & MORE! Visual Products, Inc. www.visualproducts.com Call 440.647.4999

START THE SHOW
WITH ALAN GORDON COMBO SLATES

Made in USA



Our handcrafted scene slates are made from premium engraved acrylic with Alder wood clappers, giving you the quality your production wants at the price your budget needs.

Available in color and B&W
www.alangordon.com

| | | |
|----------|-----------|-----------|
| Prod. | Scene | Take |
| Roll | | |
| Director | | |
| Camera | | |
| Date | Day/Night | Sync/Mos. |

Scooter Dolly



best innovation

NEW NEW NEW

www.movietech.de

For the latest in Cinematography

LOG ON TODAY
www.theasc.com

FINALLY...



A BETTER WAY TO STAND



ON YOUR OWN THREE FEET.

 3ispreader.com

CAMBERWELL FILM STUDIOS LONDON, UK

- Greenscreen Studios
- Crew
- Red, Arri, 4K Lights
- Specialized Equipment
- Production and Location Services, UK & Europe

STUDIO@CAMBERWELLSTUDIOS.CO.UK
WWW.CAMBERWELLSTUDIOS.CO.UK • +44 20 7737 0007

The American Society of Cinematographers

presents

A Jumpstart Guide and Calculator for the Student Cinematographer



A learning tool for the absolute beginner. This simple guide contains the most basic principles of cinematography, concisely presented and easily understood. Laid out on a durable two-sided three-ring binder card.

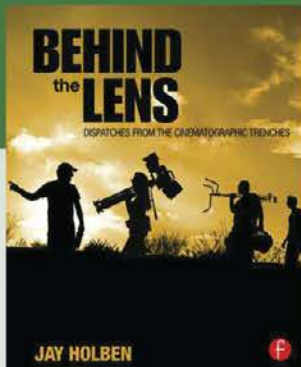
visit the ASC store at:

www.theasc.com

Advertiser's Index

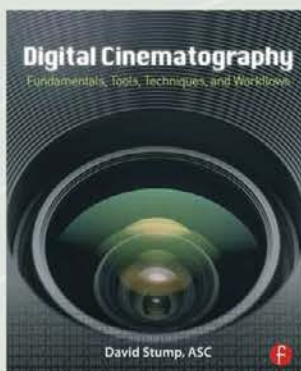
- Adorama 19, 47
- Aerial Mob, LLC 75
- AJA Video Systems, Inc. 23
- Alan Gordon Enterprises 91
- Arri 9, 21
- Arri Rental 31
- ASC 48, 95
- ASC Master Class 8
- Aura Productions 89
- B&H Photo-Video_Pro Audio 29
- Backstage Equipment, Inc. 73
- Blackmagic Design, Inc. 11
- Cambwell Studios Ltd. 91
- Camerimage 57
- Cavision Enterprises 90
- Chapman/Leonard Studio Equip. 55
- Cinelease, Inc. C3
- Cinematography Electronics 73
- Cinekinetic 90
- Cooke Optics 13
- CTT Exp & Rentals 85
- CW Sonderoptic GmbH 25
- Digital Sputnik Lighting Systems 27
- DMG Technologies/DMG Lumiere 43
- Eastman Kodak C4
- Filmotechnic 87
- Fluotec 73
- Groupe TVE/Mels Studio and Post 45
- Haskell Wexler Books 64
- Hollywood PL 89
- J.L. Fisher 49
- Jod Soraci 89
- Jumpstart Guide 92
- K5600 33
- Kino Flo 65
- Lights! Action! Co. 90
- Maccam 81
- Mac Tech LED 17
- Mole-Richardson/Studio Depot 77, 90
- Movie Tech AG 91
- NAB 59
- NBC Universal 17
- Nila, Inc. 85
- Panasonic Communications Co. 7
- Paralinx 41
- Pille Filmgeraeteverleih GmbH 90
- Powermills 90
- Pro8mm 90
- Red Digital Cinema C2-1
- Revolution 435 D&C/Bolt 15
- Schneider Optics 2
- Super16, Inc. 91
- Teradek, LLC 5
- Tiffen 35
- TNS&F Productions 91
- Ushio 75
- Willy's Widgets 90
- www.theasc.com 63, 93

THE ASC STORE



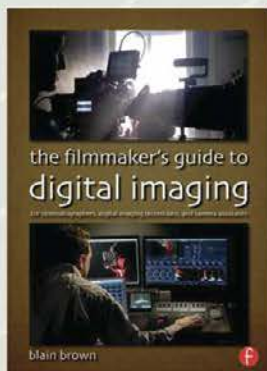
Behind the Lens: Dispatches from the Cinematic Trenches

Jay Holben has compiled nearly 100 of his best articles on everything from camera technology and lenses to tips and techniques for better lighting.



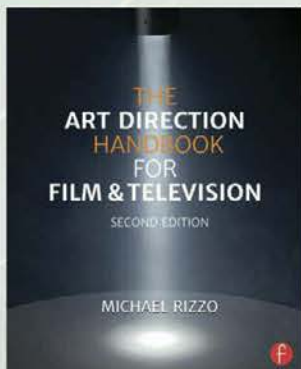
Digital Cinematography: Fundamentals, Tools, Techniques, and Workflows

This book empowers you to correctly choose the right camera and workflow for your project from today's incredibly varied options, as well as understand the ins and outs of implementing those options.



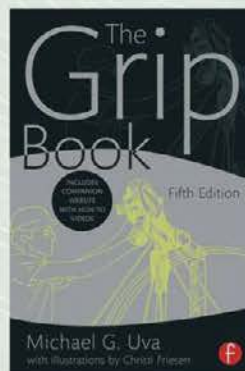
The Filmmaker's Guide to Digital Imaging

This book showcases new filmmaking roles such as that of the DIT (Digital Imaging Technician), Digital Loader, and Data Manager which are integral to today's motion picture production process.



The Art Direction Handbook for Film & Television 2nd Edition

Michael Rizzo covers art direction for television, in addition to updated coverage of film design.



The Grip Book The Studio Grip's Essential Guide 5th Edition

Gain the essential skills of a professional grip to become the jack and master of all trades on a movie or television show set.



Alan Gordon Mark Vb Director's Viewfinder

The Mark Vb is the latest version of the Academy Award Winning Mark V and continues to be the choice of Film and Video makers worldwide. The Mark Vb has all the features of the Mark V plus new markings on the Aspect Ratio ring, making it easier to read for both film and video use. We also eliminated the 1/2" video window and replaced it with the current video chip standard of 2/3." Film sizes and video formats are color-coded for quick reading.



Clubhouse News



Left: Gary Capo, ASC. Right: Lula Carvalho, ASC, ABC.

Society Welcomes Capo, Carvalho

New active member and Southern California native **Gary Capo, ASC** sparked to action photography early on, borrowing his father's 8mm camera to film his friends and fellow surfers. After graduating from Brooks Institute with a degree in underwater photography, he spent 18 months traveling the world to make the self-financed 16mm surfing movie *Many Classic Moments*. The success of that project led to a job at Warren Miller Films, and from there Capo moved on to shoot commercials, TV news and two Olympic Games. Capo caught his Hollywood break when a short film he had directed and shot caught the eye of director Randal Kleiser, who brought him aboard *White Fang* as 2nd-unit director-cinematographer. Soon after, a former colleague approached him about *Baywatch*, and Capo worked on that hit series for four seasons, shooting and directing 2nd unit and doing some main-unit work as well.

As a 2nd-unit director and cinematographer, Capo has collaborated with many ASC members, including John Toll, on *The Thin Red Line*; John Schwartzman, on *Night at the Museum: Battle of the Smithsonian*; Eduardo Serra, on *Blood Diamond*; Caleb Deschanel, on *Fly Away Home*; and Roberto Schaefer, on the upcoming

Geostorm. Capo's main-unit cinematography credits include *Final Destination 2*, *Cellular* and the upcoming release *The Concerto*.

New active member **Lula Carvalho, ASC, ABC** was born in Rio de Janeiro in 1977 and spent his childhood on film sets with his father, the acclaimed cinematographer and director Walter Carvalho. At age 10, he learned how to load magazines in the camera department, and by age 20 he was working as a 1st AC. He pulled focus on more than 19 Brazilian features, including *City of God*, *Behind the Sun* and *Carandiru*. During this time, he also worked on short films, documentaries and music videos, and lent his talents to features as a second-unit cinematographer and camera operator. In 2005, Carvalho shot *Incuráveis*, his first feature as 1st-unit director of photography. Carvalho was awarded Best Cinematography accolades for *Elite Squad* and *Elite Squad 2: The Enemy Within* from both the Brazilian Cinema Academy and the Brazilian Foreign Press Association.

Carvalho's first U.S. studio feature was *Robocop* (2014), followed by *Teenage Mutant Ninja Turtles* (2014). His credits also include the television series *Narcos*, and he recently won the ABC Award and the Cinema Brazil Grand Prize for Best Cinematography for *A Wolf at the Door*.

Kaufmann Named Associate

New associate member **Andreas Kaufmann** currently serves as chairman of the Leica supervisory board and has helped bring the classic Leica brand into the digital age. After studying at the University of Stuttgart and serving as a history teacher for 15 years, Kaufmann and his brothers purchased a percentage of Leica in 2004; by 2006, he was sole owner of ACM, which had become the majority shareholder of Leica and owner of CW Sonderoptic, the latter of which was formed in 2007 to develop Summilux-C lenses.

Yedlin Releases Display-Prep Demo

Steve Yedlin, ASC, recently released a seven-minute demo film that explores how characteristics of an image's look that are often attributed to a capture format can be manipulated precisely and individually during preparation for display. Yedlin shot the demo in July 2015 and presented it at this year's Camerimage. The material was mastered in uncompressed 4K for theatrical projection and is available online in digitally compressed, lower-resolution formats. The demo can be viewed at: www.yedlin.net/DisplayPrepDemo.

Society, AC Attend Camerimage

The 23rd Camerimage International Film Festival recently wrapped in Bydgoszcz, Poland. **Ed Lachman, ASC** won the 2015 Golden Frog for the period drama *Carol* (AC Dec. '15). Numerous ASC members served on the festival's juries, and a number of others — as well as AC editor-in-chief and publisher Stephen Pizzello, and contributors Benjamin B and Iain Marcks — also attended and participated in panels, workshops and other activities.

For more information about the ASC's participation and the Camerimage festival as a whole, visit www.theasc.com.



The 10th Edition of the **American Cinematographer Manual**

- 6" x 9", Full Color
- Hardbound edition – 998 pages
- Two-Volume Paperback
 - Volume One – 500 pages
 - Volume Two – 566 pages
- iPad ebook
- Kindle ebook
- Digital capture and workflow terminology
- The explosion of prosumer cameras in professional use
- Previsualization
- 3-D capture
- LED lighting
- The Academy Color Encoding Specification (ACES)
- Digital camera prep and more!

The *AC Manual* is available in a hardbound edition, iPad and Kindle editions, and a two-volume print-on-demand paperback.

available at **www.theasc.com**



Close-up

Greig Fraser, ASC, ACS

When you were a child, what film made the strongest impression on you?

Like most guys my age, the films that were the most influential had to be the original *Star Wars* trilogy and the Spielberg films of that time: *E.T.*, *Raiders of the Lost Ark*, etc. I remember seeing *The Killing Fields* for the first time as a young teen and being completely altered by that experience. That defined the mark of a truly exceptional film for me — beyond entertainment and into life-altering events.

Which cinematographers, past or present, do you most admire?

A very long list, since I would like to think that as cinematographers we learn from all our peers. To be specific, though, [ASC members] Jordan Cronenweth, Conrad Hall, Roger Deakins, Harris Savides and Chris Menges have all been incredibly inspirational.

What sparked your interest in photography?

I was often drawn to creative writing and film-making at high school, but I found when I started photography that a great still image can sum up — or make you question — so much. The right photograph, properly executed, is the most economical way to tell a story.

Where did you train and/or study?

Royal Melbourne Institute of Technology, where I studied photography. Once I decided to pursue cinematography, I immersed myself in as many films as I could see, and studied them intently. I was also incredibly inspired by music videos and commercials by Mark Romanek, Spike Jonze and Jonathan Glazer.

Who were your early teachers or mentors?

My first photography teacher was Rob Mau. Some of my early teachers were also the directors I was working with when I started in the film industry. Transitioning from photography to film was a great challenge; I still think some of those guys are the best photographers I know.

What are some of your key artistic influences?

I learned doing the film *Bright Star* that my most useful visual influence was not actually visual. I studied the poetry of John Keats in prep for that film, and found the imagined images those words evoked stronger than a lot of visual references. The world I immerse myself in during prep depends on the film.

What has been your most satisfying moment on a project?

I must say, being blessed to be able to shoot the very best actors,

guided by the very best directors, clothed by the very best costumers, on sets by the very best designers, is the highlight of my career. The beauty of a great collaborative relationship is incredible.

Have you made any memorable blunders?

Lots, and way too many to list, because I would like to work again.

What is the best professional advice you've ever received?

It must be a lighting tip: 'When in doubt, turn it off.'

What recent books, films or artworks have inspired you?

Alejandro Iñárritu always makes incredibly inspiring films, as do Alfonso Cuarón and David Fincher. I loved *House of Cards*, and also an Australian series called *The Beautiful Lie*, [episodes of which] my friend Glendyn Ivin directed. I'm loving photography by Michael Goldberg and art by Ant Keogh. I must admit though, with three children under the age of 4 years old, trips to the cinema have been reduced. I recently watched *Inside Out* with my 4-year-old and was blown away by the quality of the cinematography — this has not received nearly enough attention in this category.



Do you have any favorite genres, or genres you would like to try?

No favorite genres. Generally, once I've shot a genre, I try not to do another like it for quite a while. I'd be keen to try doing a musical, though — a little out of character, but I always like a challenge. And come to think of it, maybe animation would be interesting, too.

If you weren't a cinematographer, what might you be doing instead?

I would have continued as a photographer. If not that, then who knows? Unfortunately, I don't have any useful skills for anything else.

Which ASC cinematographers recommended you for membership?

Roger Deakins, Rodney Taylor, Mandy Walker, Steven Fierberg.

How has ASC membership impacted your life and career?

Being supported by my peers and the ASC community at large is a great feeling. Despite all our diversity, and our different tastes and styles, the ASC helps us become a cohesive group to voice all things creative and non-creative. ●

NOW AVAILABLE FOR RENT, EXCLUSIVELY AT CINELEASE



HOW WILL YOU USE IT?

ENVISIONED BY *CINELEASE*

Quantum¹²⁰
BY CINEO



75,000 LUMENS AT 1200 WATTS • 4'X4' IN SIZE • COLOR ACCURATE CCT
VARIABLE FROM 2700-6000K • SUPPORTS LOCAL, DMX, AND RDM DIMMING

CINEO
LIGHTING

WWW.QUANTUM120.COM

CINELEASE

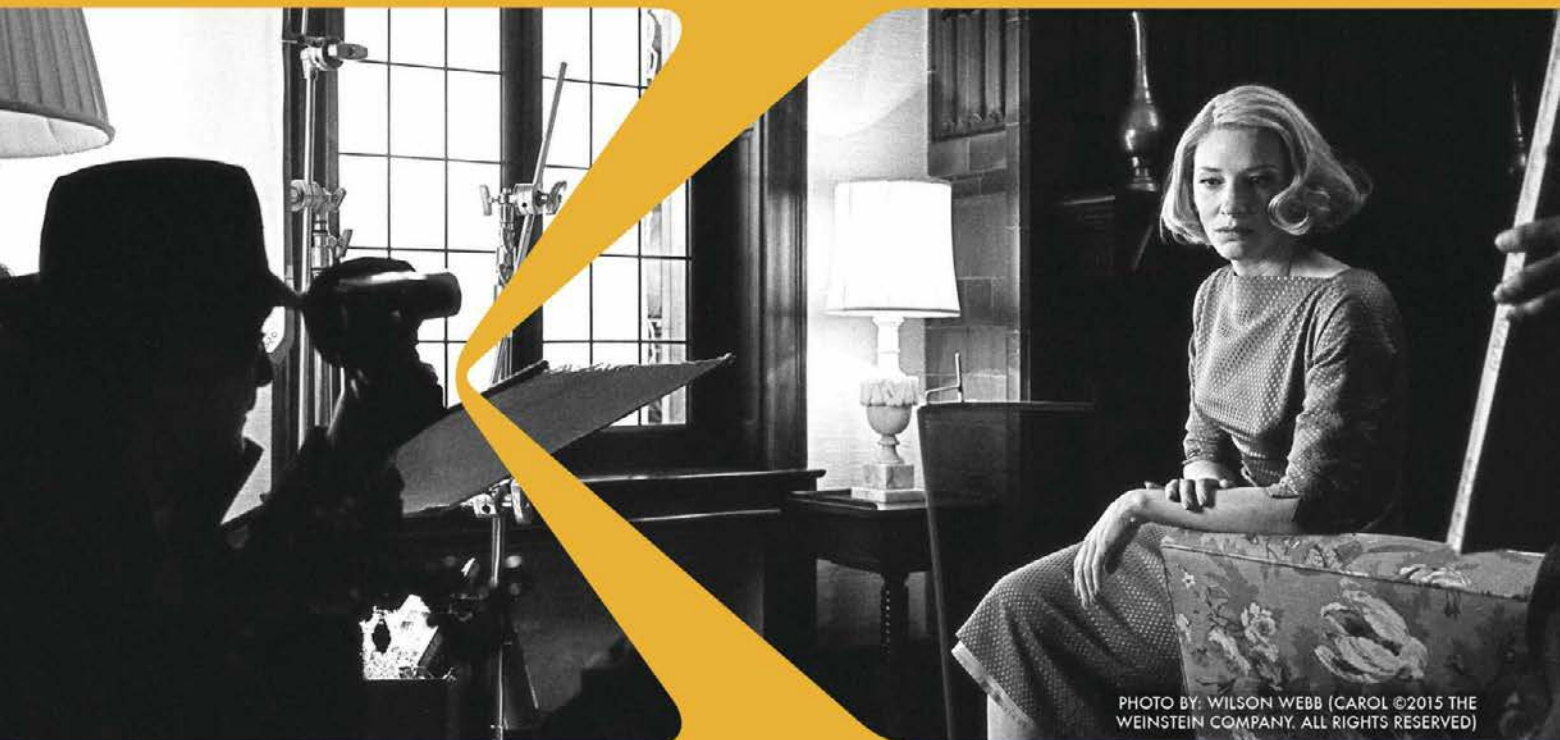


PHOTO BY: WILSON WEBB (CAROL ©2015 THE WEINSTEIN COMPANY. ALL RIGHTS RESERVED)

"I like to think of film as something you're feeling under the surface of the characters, which is seen while hidden to create the emotions of the story."

- ED LACHMAN, ASC "CAROL"



HOW BRILLIANCE DEVELOPS

#SHOTONFILM